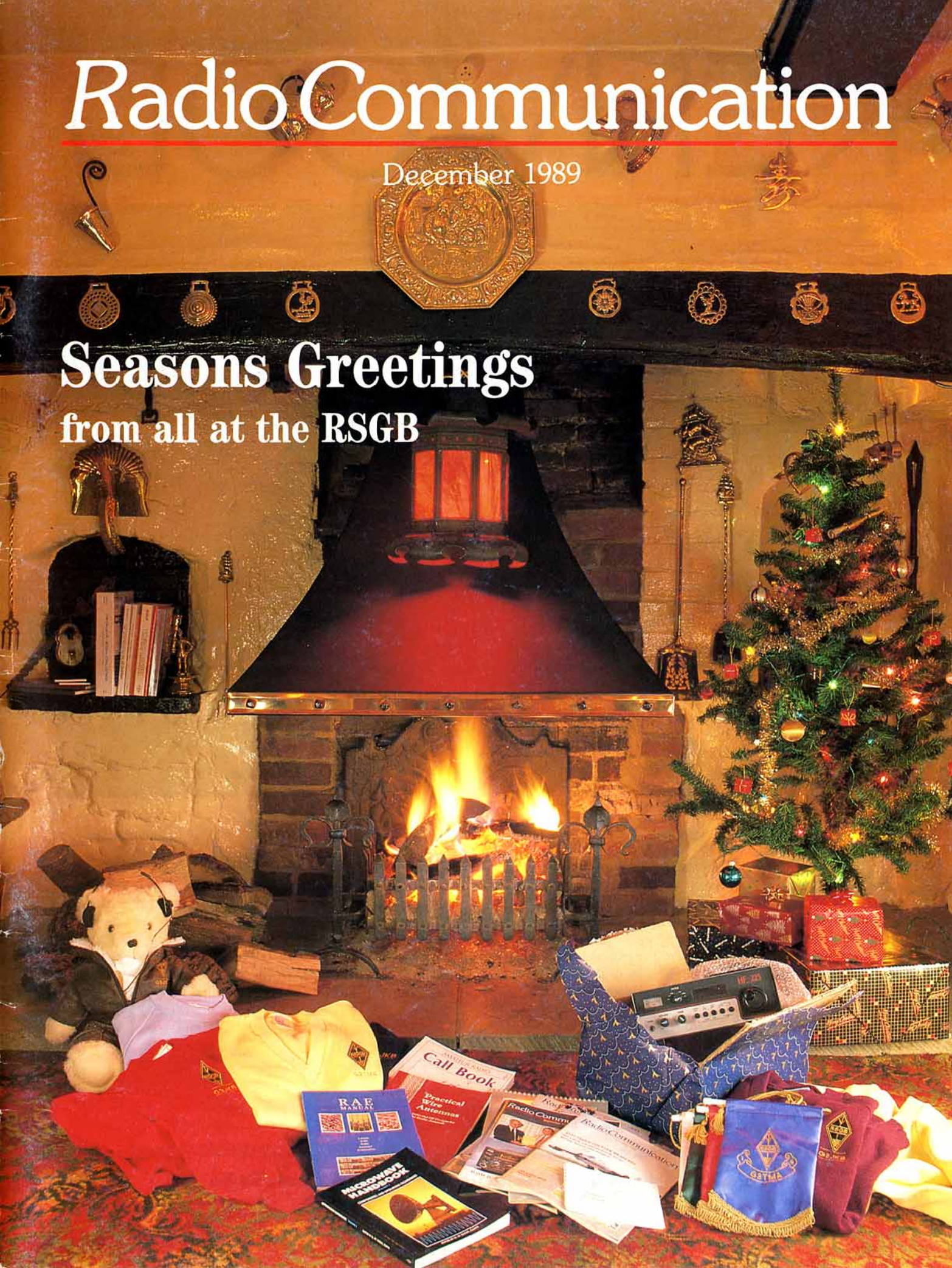


Radio Communication

December 1989

Seasons Greetings
from all at the RSGB



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CONTENTS



Our thanks to Roy and Mildred Schofield of The Old Maypole public house, North Myms, Herts, who generously donated their location for Leukaemia Research.



The winner of our DX Competition, Graham Matthews, G4LLI — page 7.



American high school student La Toya Keene, KC4IZM, on the air — page 44.

4 SOCIETY AFFAIRS

President's Seasonal Message, New RLO's, Council Brief, VHF Contest Help Wanted, From the Secretary

7 NEWS

DX Competition Results • HF Convention • Young Amateur of the Year • North Atlantic Island Raynet • Product News • Christmas Quiz • Shambolic Shack Winners

15 SPECTRUM ANALYSIS

• HF
• HF PROPAGATION PREDICTIONS
• VHF/UHF
• SWL

23 AUTOMATIC GAIN COMPRESSION METER

In these days of increasingly overcrowded bands, here is a home-brew project to help you avoid overdriving your linear amplifier.

35 TECHNICAL TOPICS

Batteries with less mercury • 13.8V power units • Early transmitting loop • Low cost FETs • Co-axial plug lore • Up-date on ears • DIY low cost extendable mast

39 BALANCED TO UNBALANCED TRANSFORMERS

There's more to the humble balun than meets the eye...

43 THE BARDSTOWN EXPERIMENT

How a high school teacher in Kentucky put amateur radio on the syllabus

46 RSGB MAIL ORDER PRICE LIST

Plus details of the *RadCom* PCB service

50 COLUMNS

• **DATAComms** Win a TNC Crossword Competition
• **SATELLITES** History, Easy satellite working, News
• **MICROWAVES** News, Circuit kits, Awards
• **SWL** January Challenge, 1990 Tables, News
• **EMC MATTERS** The RIS and the Radio Amateur

55 IN PRACTICE

IP ratings • Battery types • Logic families • Quick cheap balun • Hi-fi nonsense

69 VHF NATIONAL FIELD DAY RESULTS

Overall result, individual band reports and tables

73 CONTEST NEWS

• **RULES** Alterations to VHF rules
• **RESULTS** 144MHz and SWL, 50MHz Trophy, 432MHz Low Power

84 MEMBERS' ADS

86 HELPLINES

87 DIARIES AND DATES

88 UK BEACON LIST

89 THE LAST WORD

90 INDEX TO ADVERTISERS

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

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Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Membership Services Department from which full details of Society services may also be obtained.

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Affiliated club or society/registered group (UK): £20.50 (including *Radio Communication*): £12.30 (excluding *Radio Communication*) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

President's Seasonal Message



Looking back, the highlight of 1989 was undoubtedly the introduction of the revised licence. After many years of work, the licence is now up to date and many new facilities were introduced,

particularly regarding unattended and maritime mobile operation.

Our investment in the future of amateur radio continued with the joint DTI/RSGB presentation to industry on project YEAR. The DTI have received our novice licence proposals very favourably and we look forward to seeing these implemented during the coming year. We will be relying heavily on our members to run courses and provide examiners. It is gratifying to see the enthusiasm that has been shown for project YEAR, the novice licence and the Young Amateur of the Year award.

The interests of the amateur need defending on an increasing number of fronts, especially EMC, planning, spectrum abuse and frequency allocations. Society is changing, and the onus for solving many of these problems is shifting from central government onto the individuals involved. Much of these extra work has fallen on RSGB, and it cannot be borne without support from the membership both in form of finance and volunteer assistance.

As 1992 approaches, we are beginning to see some direct effects of the European Community (EC) on amateur radio. The CEPT licence agreement came into effect in the UK this year, simplifying operation in other EC countries. Progress has been made with the EC EMC directive, but the ramifications of this legislation are still far from clear. EC legislation will have an increasing impact in the future, some of it beneficial, some of it not. Just as a national society represents interests to its national administration, amateurs in the European Community will need a means of coordinating and representing their interests to their administration, the European Parliament. The first steps along this route have been taken by the formation of an IARU working group of EC national societies.

For some time now, our income has been barely adequate to fund all these activities. The facilities available to the amateur service are a privilege, and members must be prepared to pay a realistic cost of maintaining and defending our interests.

There have been some significant changes to the format of *RadCom*, and our investment in DTP facilities has assisted with both *RadCom* and book production. This year has also seen the recruitment of two new senior staff at HQ, and this should help improve many aspects of the operation.

Finally, I would like to thank all those members and staff who have made contributions to the Society's work over the year.

Best wishes for a Merry Christmas and a Happy New Year to you all.

Julian Gannaway, G3YGF

New RLOs for the South West

At the Membership Liaison Committee meeting on 4 November, two new RLOs were appointed for the south west of England. They are:

Ken Watkin, G3AIK, for South Somerset and North Dorset, approximately covering the area from Wells to North Dorset — north of Dorchester, and west to Taunton. Contact address is Bow House, Hurst, Martock, Somerset TA12 6JU, tel. 0935 825266.

Ken Powell, GINCG, for South Dorset, covering Dorchester southwards, and, on a temporary basis, the area in Devon as far west as Hcinton and Sidmouth. His address is 17 Shipstal Close, Hamworthy, Poole, Dorset BH16 5AU, tel. 0202 666050, or on packet via GB7BNM.

Vacancies still exist for RLOs for Devon and North Somerset. If you are interested, please contact the Zonal Council Member, Peter Chadwick, G3RZP, at Three Oaks, Braydon, Swindon, Wilts SN5 0AD, tel. 0666 860423.

COUNCIL BRIEF

23 September 1989

■ Council debated, at length, the Articles of Association which applied to the length of service of a member on Council. It now appeared that there was a loophole whereby an individual Council member could retire early and stand for Council indefinitely without a one year break. It was agreed that the spirit of the changes made to the Articles in the 1970s should be upheld. The Society's Solicitors would be instructed to prepare changes to the Articles to close the loophole and to hold an EGM in December 1989 to put the changes to the membership.

■ Mr W. McClintock was confirmed as the new Honorary Treasurer and joined the meeting.

■ The misuse of GB3NA and of the packet radio network was discussed. Meetings with the DTI to discuss repeater abuse were planned. The Society's Repeater Management Group was asked to prepare a code of practice for packet radio operation.

■ Progress on Project YEAR work was noted. The DTI had reacted favourably to the Novice Licence Discussion Document. Current work was primarily concerned with the Novice Licence document itself and the establishment of the associated training course.

■ The Honorary Treasurer discussed the 1988/89 Accounts which were approved by Council for publication in the November issue of *RadCom*.

■ The recipients of the Society's annual trophies were agreed by Council. Two new trophies from Marconi Defence Systems, and Mr H Mee, G5MY, were gratefully received.

■ Mr G. Smith, G4AJJ, was appointed Chairman of the Membership Liaison Committee.

■ Council agreed in principle to allow Associate Members over the age of 18. This would require an Article change. The Society's Solicitors would look at the matter in detail.

■ Council decided not to fill the casual vacancy on Council which

arose following the resignation of Mr N O'Brien, G3LP.

■ The Region II and forthcoming Region I IARU Conferences were discussed. It was noted that Mr Tim Hughes, G3GVV, was to prepare a report on the recent Region II Conference.

■ Hilary Claytons-Smith, G4JKS, was appointed Project YEAR Co-ordinator; she would meet the Secretary regularly to discuss priorities. A Project YEAR Champion was still required.

■ It was noted that a ceremony would take place in Ardrossan, Scotland, on Monday 11 December 1989. This would be to mark the first successful reception of amateur signals across the Atlantic Ocean in 1921. The ARRL in its 75th Anniversary year (1989) had supplied a plaque to be erected in Ardrossan close to the reception site originally used by Paul Godley.

■ It was agreed in principle that the RSGB should provide a delegate to attend the 1992 World Administrative Radio Conference. It was noted that the RSGB had supported a radio amateur at the 1979 WARC as part of the official UK delegation.

■ Other matters discussed included; GB2RS news broadcasts, attendance at the Friedrichshafen Hamfest, and the RSGB attendance at the forthcoming C&G RAE Advisory meeting.

VHF Contest Help Wanted

Volunteers are wanted to adjudicate VHF contests, help formulate new ideas regarding contests, scoring et al. Must be prepared to give up valuable free time, sleep, etcetera.

Qualifications: a thorough knowledge of the bands between 50MHz and 1296MHz (not necessarily all), or a real interest in contesting; availability once a month (maximum) to attend meeting in London.

Please write to the VHFCC Chairman, Bryn Llewellyn, G4DEZ, 110 South Avenue, Southend, Essex SS2 4HU. (tel. 0702-460747), giving details of your interests and what you consider your best qualifications. There are three posts vacant, and there is no upper or lower age limit.

FROM THE SECRETARY

Answers on a postcard please . . .

With this month's *RadCom* every member will receive a postcard. It asks for help. If you would like to assist the Society, as a volunteer, in any of the areas indicated please tick the appropriate space and return the card to RSGB HQ. Why does the RSGB need help?

When the Society was founded in 1913 by a group of dedicated enthusiasts, there was a great spirit of unity to advance amateur radio and to make it more popular. Truly, the early members could be seen to be the Society working for the common good. Today, with a much larger organisation, it is perhaps less clear that the members are the Society and that a fusion of effort can achieve more than that available from a number of individuals each doing their own thing. Some members mistakenly regard the Society as a building in Potters Bar. The truth is that as members you elect the Council to direct the operation and policy of the RSGB. It is the staff, at the administrative HQ in Potters Bar, and a whole host of volunteers, including the Council members themselves, that carry out Council policy and work for the benefit of amateur radio, within the limits of the resources and time available.

If the Society is to achieve even more than it does now for amateur radio, it either needs more funds to employ more staff or more volunteers to work on today's goals. Take any of the services, benefits or objectives of the RSGB and quickly it can be appreciated that they would benefit from an injection of extra effort. That effort can only come from the members and it is up to the elected Council to channel such positive effort for the future of amateur radio.

What help is needed? If the prime objective of the RSGB is to benefit amateur radio then the future of the hobby is of paramount importance. Here Project YEAR is the focal point of the RSGB initiative. Much progress has already been made (see the Society Annual Report in last month's *RadCom*) but more effort is needed. People to teach the next generation of radio amateurs and to pass on their skills are required. Writing books, designing projects, assisting with examinations. A wide variety of skills are required. Many members have already advised the Society of their interest in Project YEAR work. If you have not already written in and want to help, please return the postcard.

What other help is needed? EMC - the Society (the members) needs local co-ordinators, technical, legal and social advisers. Planning permission for your antenna and its supports; we need more experts to help and advise others. Other services such as slow morse transmissions, intruder watch, the QSL bureau and the Morse test service always require more help. Abuse of the amateur bands does seem more prevalent in some areas of the country at present. To help combat this problem the RSGB requires volunteers to monitor and report such problems. The HQ building could even do with a lick of paint in some cases. Also some improvements to GB2RS are being discussed - could you help to write and co-ordinate the script for local news? Liaison officers - there are still vacancies to be filled. The job of an RLO is a vital and important one. Could you take on this public role?

Belonging to any Society implies putting something back into it, not just taking from it. If the RSGB is to be more successful then the tradition of members helping other members must continue. Already the Society has over a thousand members who have volunteered to help others in a very wide variety of ways. If you have a skill or talent which could benefit other members please help. For as little as an hour a week you could directly help other members. Please think about it and if you decide to volunteer send us a postcard.

Finally, Season's Greetings on behalf of all the staff at RSGB HQ.

David Evans, G3OUF

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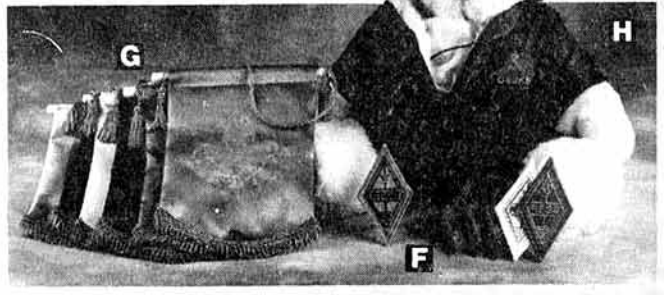
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The proud winner Graham Matthews, G4LLI, (centre) receiving the tickets for his holiday in The Gambia from Simon Miles of Serenity Holidays (left). He was also presented with a certificate by Brett Rider, G4FLQ, of the RSGB (right).

DX Competition Results

We had nearly 200 entries for the DX Competition we ran in conjunction with Serenity Holidays in our June, July and August issues.

The task at first sight didn't seem too horrendous; all we asked was for you to identify potential DX locations from clue-photos, estimate the distances between them, and finally calculate the total distance between the start and finish point which, not surprisingly, was RSGB HQ in Potters Bar.

Very few entrants got all of the locations, ITU prefixes and capital cities correct; the winner and runners up not only got all of them right, but were the three closest to our calculation of the total distance. From the answers received it was clear that many methods were used

to arrive at this figure — including pure guesswork.

The winner of the holiday in The Gambia was Mr Graham Matthews, G4LLI, of Horsham; to calculate the distances he used a computer, but not with an off-the-shelf software package. Instead, he devised his own geometric method in a language not many of us are familiar with — APL (which stands for 'A Programming Language', believe it or not) — and he was shrewd enough to incorporate our example into its structure for verification.

Keen on the prospects of the trip (despite our constant, unfair reminders of the side-effects of the necessary inoculations), he ventured to extend his free week to a fortnight, and plans to take his

girlfriend Suzie with him. They will stay as guests of Ernie Sumption, C53GS, and have at their disposal a complete shack. Graham is clearly very keen to try his hand at operating as DX, but it won't be a full-time occupation — both he and Suzie are looking forward to plenty of sightseeing. We wish them a fabulous time, and expect a full report on the trip for *RadCom* shortly after their stay during March.

Congratulations also to the runners up. Mr Kenneth Cheetham, G4RWD, of Burton-on-Trent is the winner of the second prize, £30 of RSGB goods, and third prize, £20 of RSGB goods, was won by Mr S P Taylor, G4EDG, of Exeter. Commiserations to everyone else, and thankyou for entering!

Location in photograph	ITU Prefix	Capital	Distance between locations
1) <u>HONG KONG (HARBOUR)</u>	<u>VS6</u>	<u>VICTORIA</u>	<u>5043.73650</u>
2) <u>PISA</u>	<u>I</u>	<u>ROME</u>	<u>7762.95896</u>
3) <u>EASTER IS.</u>	<u>CE0</u>	<u>HANGA ROA</u>	<u>8764.57883</u>
4) <u>LUXOR</u>	<u>SU</u>	<u>CAIRO</u>	<u>4535.63714</u>
5) <u>TRISTAN DA CUNHA</u>	<u>ZD9</u>	<u>EDINBURGH</u>	<u>6385.52915</u>
6) <u>AMRITSAR</u>	<u>VU</u>	<u>NEW DELHI</u>	<u>7504.31965</u>
7) <u>RIO DE JANEIRO</u>	<u>PY1</u>	<u>BRASILIA</u>	<u>4669.0067</u>
8) <u>PITCAIRN IS.</u>	<u>VR6</u>	<u>ADAMSTOWN</u>	<u>9372.03023</u>
9) <u>SANTORINI</u>	<u>SV8</u>	<u>THESS</u>	<u>686.285097</u>
10) <u>VATICAN</u>	<u>HV</u>	<u>VATICAN CITY</u>	

Tiebreaker: The total distance between the locations listed above in the order in which they appear, starting and finishing at RSGB HQ in Potters Bar is 60,692.7645 International Nautical Miles.*

EMC Co-ordinator's Scheme

Members who are experiencing difficulties in solving a breakthrough problem are invited to look up the EMC co-ordinator for your zone from the list below and give him a ring. Before you do so:

1. Make sure that you have done everything possible to solve the problem yourself - i.e. fitted filters, checked antennas, connectors, etc.
2. Arm yourself with as much information as possible which will be useful to the co-ordinator - make, model and age of affected equipment, distance from neighbours, bands and modes which cause most breakthrough, etc.

3. Remember that the co-ordinator is a volunteer, so please ring at sociable times.

4. Remember also that the scheme only offers telephone advice at present - no visits will be made. More info in the EMC column in this issue. If you're not sure which zone you're in, have a look at page 83 of the October edition of *RadCom*.

Zone A

D Smith, G3LIS - 0695 77960
N Carr, G0JHC - 0772 742710

Zone B

Please use the Helpline - 0329 239644

Zone C

R Sykes, G3NFV - 0372 372587
K Hendry, G0BBN - 0268 755350

Zone D

S O'Sullivan, G8VPG - 0225 873098
M Goodfellow, G4KUQ - 0272 716093

P Fletcher, G8TWD - 0703 252848

Zone E

J Lawrence, GW3JGA - 07456 3255
C Barnes, GW4BZD - 0248 361195

Zone F

C Corderoy, G14CZW - 0365 24500

Zone G

D Morris, GM3YEW - 07388 5533
R Adam, GM4ILS - 0343 545842
G Brooks, GM4NHX - 08478 3570
Rev S Bonnie, GM4PTQ - 0851 3609

NEWS REPORTS

The 1989 HF Convention took place at the Belfry Hotel, near Oxford, on Sunday October 1st. As in previous years, however, a good number of people arrived at the hotel on Saturday evening when there was plenty of lively discussion in the bar and around the impromptu slide presentations that took place.

AFFILIATED GROUPS

Numerous RSGB affiliated groups were present displaying their wares and recruiting new members. These included BYLARA, Worked All Britain, the International Short Wave League, the First Class CW Operators Club (FOC) in their own hospitality suite, the Chiltern DX Club, and the Southern UK 10M FM Group. The Royal Naval Amateur Radio Society ran their usual QRQ CW tests, and the Chiltern DXers recruited many new members as a result of their recently announced sponsorship of trophies for the best British single-ops in the CQWW SSB & CW contests.

G3VTT's team of home constructors — G0AMZ & G4VSZ — were kept busy answering questions whilst showing how to build the ARRL 'Project Goodwill' transceiver from scratch.

RSGB committees present included HF, HF Contests, EMC, and PSC. Exhibits on their stands included a demonstration of amateur radio software, and a CW pile-up copying competition.

A DX Quiz compiled by G4DYO, RSGB DX News Sheet editor, attracted much interest but few actual entries. It may have to be made simpler next year!

LECTURES

The first lecture of the day was given by John Devoldere, ON4UN, and dealt with the design of HF Yagis. A lot of good work has been done in recent years by W2PV and others to systematise Yagi design but ON4UN has taken this a step further by developing a suite of computer programs for the IBM PC which allows the user to produce a design for a monoband Yagi antenna to individual requirements. The program deals with all aspects from electrical characteristics and matching to mechanical design. Mechanical design has been largely ignored to date, but the ON4UN program calculates an optimum taper schedule for the elements as well as boom dimensions and add-on plates to balance the wind loads (in much in the same way that weights are added to balance a car tyre). John not only demonstrated his program, but also showed some mouth-watering slides of the end results — in his case six-element Yagis for 10 & 15 metres and a

1989 RSGB HF Convention



massive full-size 3-element beam for 10 metres. Copies of John's software were available for purchase later in the day, and a book is promised in due course, so perhaps we will see some well-designed homebrew Yagis appearing around the UK.

Peter Chadwick, G3RZP, the second lecturer, is now well known for his blunt approach, reducing complex subjects to simple statements illustrated with excellent slides and spiced with a generous sprinkling of humour. His lecture this time was no exception. The subject this year was 'Are our Rigs Good Enough?'. Peter's presentation explained the factors that a designer should consider, including: noise floor, intercept point, gain compression, and intermodulation products.

There was a packed hall for the trophy presentation ceremony when the various contest winners received their rewards. The ROTAB Trophy this year went to Ian Shepherd, G4LJF, in recognition not only of his outstanding DX work from his superbly equipped home QTH but also of his solo DXpeditions to the Indian Ocean and Caribbean. The G5RP Trophy, in memory of the late Ted Wake, was awarded to Andrew Shaw, G0HSD, for outstanding DX

progress in the last year. (Readers are reminded that nominations for the G5RP Trophy next year should be sent to the Chairman of the HF Committee, G3ZAY, by the end of July 1990. The period relevant to the award of the Trophy is 1 July '89 to 30 June '90. Detailed guidance on the format of nominations is available from G3ZAY at 41 Enniskillen Rd, Cambridge, CB4 1SQ.)

HF FORUM

Back by popular request was the HF Forum where RSGB Committee members were available to answer questions on any HF topic. They were joined by *RadCom*'s new Editor, Dave Bobbett, G4IRQ, who quickly found himself in the firing line. Other panel members were Ron Glaisher G6LX (HF Contests Committee Chairman), Martin Atherton G3ZAY (HF Committee Chairman), Alan Dearlove G1WZZ (EMC Committee Chairman), Geoff Grayer G3NAQ (Propagation Studies Committee), Brendan McCartney G4DYO (DX News Sheet Editor), and Roger Balister G3KMA (IOTA Awards Manager).

GW0ANA asked why he had not yet received his RSGB 75 Award, an immensely long time after he had submitted the claim. G4IRQ replied that he believed all certificates had

now been despatched but would check on return to HQ and advise GW0ANA in writing.

G3IQF was concerned about poor coverage of HF matters in *RadCom* and the need to link adequate forward advice of contests with publication dates of the magazine. G4IRQ replied that he, and the other spectrum reporters, could only use what they were given and that it was up to readers to contribute. G6LX commented that the Contests Committee were now co-ordinating well with *RadCom*.

G3AAE asked why senior officers of the RSGB were absent from the Convention and the Forum. G3ZAY replied that the HF Manager was representing the IARU at an exhibition in Geneva and that the Chief Executive and President were dividing their time between the Convention and the simultaneous 'Young Amateur of the Year' reception in Thame.

G3GWW enquired if colour could be used to improve the presentation of HF propagation predictions. G3NAQ and G4IRQ agreed that it would be necessary to consider first the results of the survey being carried out on the PSC stand outside the lecture area, where a number of possible layouts were on display.

G2DVT asked for a white

background to circuit diagrams in *RadCom* (because of the difficulty in photocopying) and G4IRQ agreed to bear the problem in mind, perhaps by using a lighter shade of blue.

G6LX confirmed that alignment of the UK and USA Field Day dates had been examined but was probably not practicable because it would result in HF and VHF FDs being only one week apart. Feedback from members on this would be welcomed.

GW4BLE asked what progress had been made to provide broadcasts of solar data in the UK. G3NAQ explained that the DTI had authorised a frequency near 3.9MHz and that a 1kW Marconi transmitter was available. However, a suitable site, preferably under university control, was still being sought.

QSL BUREAU

G3MCS asked if the problems in managing the QSL bureau had been resolved. G4IRQ said that it had been a massive task but that the split of responsibilities between G3DRN and HQ was now working very well and that the transitional problems which had resulted in delays were now a thing of the past.

G4STH wanted to know what could be done to remove commercial stations from the 80m DX window and to dissuade UK amateurs from non-DX QSOs in the window. He also asked if there was any progress on a 160m band-plan. G3ZAY replied that nothing could be done about the commercial stations since they had shared primary status (though he hoped that alternative satellite and cellular systems would reduce the amount of marine traffic) and that we could only continue to educate our peers by example and at local clubs. He could not offer any hope of an elaborate band-plan for top-band until the various European allocations were harmonized.

John Bazley, G3HCT, Chairman of the Licensing Advisory Committee, present in the audience, responded to a number of questions on distinctive club and novice call signs by saying that the whole matter of UK call signs was still under review and that he would welcome input from the members.

G0ERS applauded the encouragement of young people into amateur radio and asked if the novice licence HF facilities would automatically be given to Class B licensees. G3ZAY said that the HF Committee did not support the idea of a 'no-code' HF licence.

In response to a comment that the IARU suggestion to 'time-share' beacons on 28MHz was a bad idea

(in view of the wait for any particular beacon to come up), G3ZAY said that the intention was to have a single frequency for each continent or sub-continent, with a time-sharing regional chain of beacons relatively close together. Hence, a general idea of propagation could be gained by a quick tune across the beacon allocation and it would only be necessary to wait on a frequency if one wanted a finer level of detail. This system was more economical of spectrum than the existing one beacon per channel approach although a small number of channels were being reserved for continuous duty beacons.

GW0HSH was concerned about the number of commercial stations still occupying 18MHz and asked if the band-edge requirements were any more stringent. G3ZAY confirmed that the commercial users were having trouble finding alternative allocations and that the situation was known to the IFRB in Geneva. G1WZZ stated that the band-edge energy limitations were the same as on the other HF bands.

DX FORUM

The Convention's final session was the DX Forum, where slide presentations were given by Steve Telenius-Lowe, G4JVG, on his expedition to the Cocos Keeling Islands (VK9Y), by Hans Hannapel DK9KX on his trip to Conway Reef (3D2CR) a possible new DXCC country, and by Paul Granger F6EXV and Jacky Calvo F2CW on their visits to the Marquesas and Austral Is — potential new DXCC countries in Polynesia. The DX raffle, with its first prize of a Butternut HF6V vertical donated by HRS Electronics, raised a substantial sum for the RSGB HF Expeditions Fund.

Throughout the day, Peter Martinez G3PLX and Bill Applebee G4ZKJ, were kept busy on their AMTOR mailbox demonstration. Stations accessed were GB7PLX, HB9AK, and LA90K. As conditions were good the output traffic speed was 66wpm. Input speeds were, of course, dependent on the operator. The GB7PLX mailbox has many facilities including information files, traffic forwarding at pre-set sked times, packet gateway, and propagation forecasts.

The Convention was a great success with around 400 attendees and the HF Committee is already planning the 1990 event. If you have any suggestions on lectures you would like to hear or activities you would like to demonstrate or see demonstrated, please write to G3ZAY at 41 Enniskillen Road, Cambridge, CB4 1SQ.

VHF/UHF awards news

The following awards were issued recently:

144MHz Standard Award: Gerard Elliott, G14OWA (770)
144MHz Standard Award: Mark Dickinson, G0GTI/P (771)
430MHz Senior Award: John Hunter, G3IMV (139)
430MHz Senior Award: J P Arnold, G4NPH (140)
144MHz 60 Squares Award: Ruth Davies, GW1EHI (153)
144MHz 175 Squares Award: Byron Fletcher, G6HCV (13)
144MHz 275 Squares Award: John Hunter, G3IMV (1)
144MHz 300 Squares Award: John Hunter, G3IMV (1)
144MHz 325 Squares Award: John Hunter, G3IMV (1)
430MHz 30 Squares Award: David Sewell, G4FVK (79)
430MHz 100 Squares Award: John Hunter, G3IMV (11)
Congratulations to all.

There has been a change in the rules for the RSGB VHF/UHF/Microwave Awards, which allows amateurs living in countries other than the UK to apply for them. Note

that foreign amateurs who are RSGB members have previously been invited to apply, and this has not changed. There is no charge to RSGB members for any of the RSGB VHF/UHF/Microwave Awards - all that is required is that the applicant must enclose a wrapper from a recent Radio Communication, or supply other proof of membership. The award scheme is a service to RSGB members, however - UK amateurs who are not members may not apply for these awards.

The VHF/UHF/Microwave Awards are available to overseas applicants under the following conditions:

1. The applicant must provide proof of membership of his/her IARU-recognized national society.
2. The charge is £5, \$8 US or 16 IRCs.
3. QSL cards are required, and the applicant must include payment to cover the cost of their return.
4. Other than the above, the requirements are the same as for UK RSGB members.

Rules and application forms can be obtained from G4OUT, the VHF/UHF awards manager, whose address can be found on the title page of this magazine.

Taxing times

Members who are employed in the UK and paying income tax may be able to qualify for income tax relief on their annual RSGB membership

subscriptions. Have a word with your local tax office to check whether your particular circumstances allow this. Unemployed and retired members may not qualify, however.



Another Square Basher spliced

They're at it again; no sooner does the VHF DX season end than the Square Basher's start thinking about other things than radio. First it was G8TFI - then Basher Dave Robinson, G4FRE, did the decent thing a few weeks ago and here's the photographic evidence to prove it. The gang of suspicious characters shown in the pic are, l to r, G4DDK, G4DDK's son,

G4DDK's daughter, G4KGC and daughter, G3WDG, GW3NYY, G4FRE and G7FRE, G8TFI's wife holding what we're told is 'Ronnie Racoon' G8TFI, G8ROU, G4FZZ, G0BPU's daughters and wife and G0BPU. Think of all the lovely DX we could have worked if there'd been a mega-opening during the reception with that lot off the air...

Young Amateur of the Year

The Young Amateur of the Year presentation ceremony took place at the RSGB HF Convention on 1 October - and it was a great success. Sixteen-year-old Warwick schoolboy Ted Walker, G0KAQ, won the DTI-sponsored Young Amateur of the Year Trophy, receiving a trophy, certificate and a prize of £250 - and because of the high standard of the entry this year, the DTI awarded two runner-up prizes. One went to 17-year-old Paul Moss, G1UUX, and the other was awarded to 13-year-old Rachael Oakley.

The ceremony was attended by the Society's President, Dr J N Gannaway, G3YGF, together with a number of other Council members. The principal guests and speakers included two from the DTI; Mike Coolican, Head of Branch, Radiocommunications Division and Kate Allen, Head of Licensing. Also present were Ian Laybourne from the Mobile Radio User's Association; Tom Crosbie from Navico; Mark Johnson from Siskin Electronics; and Andrew Keeble, G1XYE, the first 'Young Amateur of the Year'.

The certificate was awarded by Nicholas Ridley, Secretary of State for Trade and Industry. Mike Coolican presented the trophy to the winner and said: "I am very pleased to have been asked to attend the second award to the Young Radio Amateur of the Year. When DTI and the RSGB put together the first proposal for such an award I was keen to support it because of my interest in helping to grow the next generation of radio engineers. I still believe that to be an important reason for supporting the award. It certainly explains this rather exceptional event of the Department paying out money to a radio licensee when as everyone knows, the traffic is usually all in the opposite direction."

"However, over the last week as I mulled over the achievements of this year's winner - and those of the hotly pursuing runners-up - I began to see that there was another equally valuable reason for supporting the award.

"It has been a characteristic of



Mike Coolican (r) presents Ted Walker, G0KAQ, with his certificate.

contestants for this award that they have demonstrated concern for others in their approach to amateur radio. Last year we saw how Andrew Keeble was involved with getting Scouts into amateur radio.

"This is as it should be. Amateur radio is about helping others, communicating with others, instructing others. How many educationalists over the years have spent many hours trying to find ways of instilling a social consciousness into the rising generation. How easy it seems when you see what these young amateurs do as a result of their hobby.

"What a stark contrast there is between the energy, enthusiasm and usefulness of what these amateurs are doing, and the useless futility of those - allegedly adult - amateurs who abuse the repeater stations and whose thoughtless stupidity drives others off the air and ends in violence either between themselves or violence offered to the RIS as they seek to impose minimum standards of decency.



Runners up Paul Moss, G1UUX, and Rachael Oakley.

"Next week I shall have to interview some radio amateurs, passing on to them Minister's views about their antics on the repeaters. It will not be a pleasant experience for them or for me.

"You may imagine that when I said how pleased I was to be here today, that painful experience to come was in my mind.

"I see in the young amateurs - and in particular, their responsible attitude to the hobby and Society - hope of a better time to come, hence my enthusiasm for the Novice Licence. Did we really do amateur radio a service by keeping Ted waiting for 2 years after he passed the RAE before we gave him his licence? I know it is always the fashion to deplore the present, to say how awful modern youth is, to hark back to the good old days. Well, people have been saying that at least since the middle ages and I guess they've usually been wrong. Certainly, I can say that the young amateurs here today are excellent examples for their elders to emulate; I hope some of them will.



"It would of course be wrong not to acknowledge that the vast majority of radio amateurs are law abiding and responsible, most were probably young themselves once! But even the good can benefit from the better and I think we do have some of the very best amateurs here today.

"I am pleased to see such a strong field for this award and delighted at the rise in number of entries particularly entries from those in their early teens and from girls. The range of activities represented and the enthusiasm reflected are very wide indeed.

"Having seen the strength of the field I do hope that unsuccessful entrants will try again next year. We shall be offering prize again in 1990.

"Before I ask Andrew to make this year's award, can I return to the theme of the role of Young Amateur of the Year as a great ambassador for amateur radio. The award - and its winners - has raised profile of amateur radio with some very welcome press and radio coverage. In this context I would like to pay a morning visit to the Independent Local Radio Companies who have been very supportive indeed of this award. Their attention and that of the Press has provided a new focus of interest both for young people and industry - witness the additional prize from MRUA; is it too much to hope for further industrial support for amateur radio in general, and Project YEAR in particular.

"All young amateurs can spread enthusiasm for their hobby. Interest in Amateur Radio is 'caught not taught'."

Mike Coolican also invited Ted Walker to a conducted tour of the DTI's Radio Monitoring Station at Baldock.

Andrew Keeble presented his successor with Council's prize - an RC14 receiver and 3.5MHz converter. Ian Laybourne presented him with an all-expenses-paid training course, and from Tom Crosbie of Navico, Ted received an AMR1000S 144MHz transceiver - together with an invitation to visit the Navico factory. He also received a Tiny-2 packet TNC from Siskin Electronics.

Dr Gannaway presented RC14 receiver kits to the runners-up, and David Evans thanked the DTI for their continuing sponsorship of the award. Finally, Icom (UK) presented Andrew Keeble with an Icom IC2 handheld and other Icom items in recognition of Andrew's outstanding work on behalf of Project YEAR during his term of office.

Who's going to win next year...?



Scottish NFD Trophy

This photo shows the Scottish NFD presentation during the recent SCOTAM at Glenrothes. Receiving the Trophy on behalf of Kilmarnock & Loudoun Amateur Radio Club are, left to right, GM3ZRT, GM40SS and GM3YEH.

Hertfordshire Radio Scout Fellowship

Ralph Nash, G1BSZ, says "Recent correspondence has urged members to contact youth organizations in order that the hobby has an influx of young blood. May I suggest that interested members consider joining their local Radio Scout Fellowship? There is no upper age limit, and there is no requirement to wear uniform. In Hertfordshire we are particularly keen to enrol members who are not actively connected with the movement, as we have a very worth-while project scheduled for next spring involving thousands of boys and girls. If you are in Hertfordshire and are interested, please contact me directly (G1BSZ QTHR)."

For those outside Herts, the address to write to is: Scout Association Public Relations Office, Baden Powell House, Queens Gate, London SW7 5JS. Sounds good - why not give it a try?

Technology Training Days

The Scout Association is to hold two 'Technology Training Days' in April 1990. Each Training Day will offer participants a variety of 'workshops' in which individuals will be able to gain 'hands-on' experience. The first day involves communication (PMR, CB, etc), electronic kits (soldering, simple circuits, tools), radio direction-finding, short-wave listening

(speech, SSTV, OSCAR, etc), amateur radio, operator skills and data. The second day - which is run as a separate course - includes audio, video, desktop publishing, computer applications and recording/production techniques. More details from the Secretary at Headquarters.



North Atlantic Island Raynet

On 2 September, three members of the North Atlantic Island Raynet team provided radio cover for the Shetland Relay Race. This takes place between North Roe and Sumburgh - a distance of over 60 miles - and has been an annual event since 1981. A team consists of 12 runners;

Help Chin WAB

S Casey, G4JQK, sent us this photograph of Chin, 9M2CW. Chin is from Ipoh, Malaysia and is an overseas member of the Society; he's currently trying to make contacts for the 'Worked All Britain' awards. Chin would very much like to work UK stations, and he's to be

found calling CQ UK every day between 2100 and 2200 on 14.135MHz +QRM. He also operates on 21 and 28MHz around 1400 on weekends beaming to the UK. Chin's station consists of an Icom 751 or TS830 with 100W PEP output and a TH3 at 53'.



Cooked ham

An item in the *Westlink Report* said that a New York amateur - Michael D Harrison, WB2PTI - was indicted by a Grand Jury of the New York District Court on charges that he '...knowingly devised a scheme to obtain money by means of a fraudulent pretense by mail'. The indictment said that Harrison placed full-page advertisements in an American amateur magazine to the effect that the long-defunct Atlas Electronics had joined forces with the Uniden Corporation of Japan to bring out the popular 2510 28MHz mobile rig and that you could have one for only \$219.95. The American government says that Harrison never delivered the promised radios even though he received a substantial number of prepaid orders. According to *Westlink*, Harrison faces a possible maximum of 250 years in gaol and a \$12.5 million dollar fine if he is convicted.

With reference to the news item 'You're nicked, mate' in the July 1989 edition of *Radio Communication*, we have been asked by Mr Derek Arthur to mention that at the time of the transmissions on 6.67MHz, neither Mr Arthur nor Mr Holwill were licensed radio amateurs.

New products

A copy of the 1989-90 Tandy catalogue (140 pp) arrived at Headquarters the other day, and we must say that if you forget about the ghetto-blasters and radio-controlled toy Ferraris there's some good stuff in there for the radio amateur. Tandy's range of hand tools and multimeters seems to get wider every year and some of the ones we've seen are of good quality; we bought a set of jeweller's screwdrivers a few weeks ago from our local branch and they were very good value at £7.99 for 16. Tandy also does a good range of components - most of the common transistors and ICs, plugs and sockets, resistors and capacitors and a jolly good range of connectors as well. They've even introduced N-types. You can get a copy of the catalogue from your local Tandy shop, or try InterTan UK Ltd, Tandy Centre, Leamore Lane, Walsall WS2 7PS - telephone 0922 710000, fax 0922 710789.

ICS Electronics have also just released a new catalogue covering their entire product range. This includes items for amateur and professional data communication, weatherfax reception, weather satellite monitoring, SSTV software and sundry other things. We particularly liked the look of the TW-2 Weather Station, which displays wind direction and speed and outside air temperature - just the thing for telling you when the tower needs to come down! Get your copy from ICS Electronics Ltd, Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD. Telephone 0907 731101, fax 0903 731105.

ICS has also introduced a new firmware upgrade for the PK-232. This adds a PakMail facility, the N7CL priority acknowledgement system, additional CUSTOM and WHYNOT commands, an additional seven-character or nine-number ARQ/SELFEC selcall structure and TDM signal reception for the SWL.

There's also '...room for additional future upgrades'. Upgrade kits cost £69.95 plus £2.50 p & p, and ICS offers a fitting service for an extra £20. More info from the above address.

Clever stuff, this packet. One day, every amateur in the world will be able to talk to every other amateur in the world by typing out the call signs and sitting back in the comfy chair to watch the QSO happening on-screen. I hope we've all got something to say to one another.

A press release from a company new to us - **ProElectron Communications Products** - arrived recently. It said "The PEK-1 Electronic Keyer from Proelectron is the first in a range of professionally designed and tested PCB modules for the radio amateur. Assembled on a high-quality CAD-designed PCB measuring only 74 x 61mm, the keyer can be built into existing equipment or, with the addition of case and connectors, can form a stand-alone unit. The PEK-1 can be used with single or twin paddles, offering features which include dot and dash memories, built-in speed control, sidetone output and low power consumption. Both solid-state VMOS and relay outputs enable a wide range of transmitter keying options.

"Priced at only £22 inclusive, the PEK-1 is available by mail order from ProElectron, 35 Cromwell Road, Cheltenham GL52 5DN. Further information will be sent on receipt of a stamped addressed envelope or by calling (0242) 571223".

Sounds interesting - pity they didn't send a pic so that we could have showed you what it looked like.

We mentioned the new Icom catalogue last month. Now we have some news of new Icom products, one of which - the IC-R1 receiver -

IC-R1 SPECIFICATIONS

GENERAL	
Frequency coverage	: 150kHz - 1300MHz.
Mode	: AM/FM/FMW.
Sensitivity	: FM 0.5µV (VHF) 0.5µV (UHF Low) 0.5µV (UHF Hi) AM 1.0µV (VHF) 1.0µV (UHF).
Receive system	: Double/Triple conversion.
Intermediate frequencies	: 266.7MHz (1st IF) 10.7MHz (2nd IF) 455kHz (3rd IF).
Selectivity	: +/- 7.5kHz (6dB).
Tuning step increment	: 0.5/1/5/9/10/12.5/20/25/50kHz
Scan speed	: 20 channels per second (High) 10 channels per second (Low).
Search	: Program search 10 channels Skip search Scan memory search.
Search speed	: 30 step/sec (high) 15 step/sec (low).
Audio output power	: 200mW.
Antenna impedance	: 50ohm.
Usable temperature range	: 0°C-50°C.
Power supply requirement	: DC 7.2V (internal battery) DC 6-15V (external jack).
Current drain	: 50mA Typ 10mA power saved 250mA Max. audio output.
Dimensions	: 49 (W) x 102.5(H) x 35(D) mm.
Weight	: 280g (9.9oz).

sounds quite extraordinary. We've reproduced the info sheet which Icom (UK) sent us since we thought that if we didn't, you might think we'd incorporated a few misprints. All we'll say here is that the Rx has a frequency range of 150kHz to 1300MHz and it's the same size as an IC2! We're very much looking forward to seeing one of these beasts in the flesh, and if Icom will lend us one we'll do a mini-review of it.

There are also two other new Icom receivers. One is the IC-R100, covering 500kHz-1800MHz in a box the same size as the IC2400/2500 series and with a list of features as long as your arm - price £499 - and the other is the IC-R72, billed as a 'budget HF receiver' with 100dB dynamic range, direct digital synthesiser and 99 memory channels at £599.

As if that wasn't enough, there's a dual-band 'mini handheld' the IC-24ET, which measures 52 x 136.5 x 34.5mm and weighs 340g. Covering 144 and 430MHz full duplex, the IC-24ET delivers 5W output on both bands. Then there's the IC-901E dual-band mobile transceiver,

which as supplied runs FM only but which will cater for SSB/CW on 144MHz with an additional unit. This must be the smallest dual-band mobile we've seen and you can mix and match 28, 50, 144, 220 and 1200MHz modules in any combination. Yours for £799.

Finally, there's the IC-726 all-mode transceiver covering all bands between 1.8 and 50MHz inclusive. It runs 100W on HF and 10W on 50MHz, and the 726 has the same DDS synthesiser system as that fitted to the £4.5K IC-781. As usual these days, the rig incorporates general-coverage Rx facilities between 30kHz and 33MHz and also 46.2-61.1MHz. A snip at £989.

More on all these wondrous Icom items from Icom (UK), Sea Street, Herne Bay, Kent CT6 8LD. Telephone 0227 363859, fax 0227 360155.

Fancy a 430MHz bargain?

As of the beginning of next year, the 420-460MHz PMR band changes over from 25kHz to 12.5kHz channel spacing. Steve Marsh, G4BWG, is managing director of the Croydon-based SoCom Group (a major-league player in the mobile radio business) and he tells us that he'll have a large quantity of UHF PMR portable and mobile equipment available shortly as a result of the changes. Steve reckons that most of it will be easy to get on to 430MHz and says that anyone wanting more information or wishing to buy a nice radio is welcome to contact him on 01-680 1585.





Yes, folks - it's that time of year again, when we invite you to sprain your brain with our answer to the Radio Amateur's Examination - the *RadCom* Christmas Quiz! Specially designed as an alternative to stuffing too many crisps and peanuts whilst gazing at the telly over the holiday, this ought to keep the little grey cells busy and stave off the boredom for another year - and, as you'll see when (if) you get to the bottom, we have some nice prizes.

CHRISTMAS QUIZ

1. Where and what is GCC?
2. Where and what is GBR?
3. Who owns GBTT, and what is her name?
4. What did Joseph Henry invent in 1835?
5. What did J A Fleming patent in 1904?
6. What did H J Round introduce in 1926?
7. What did the Varian brothers describe in 1939?
8. What did Bardeen, Brattain and Shockley invent in 1948?
9. What does the 'RG' in RG213 stand for?
10. What does the 'GT' in 6L6GT tell you?
11. What's the difference between a 4X250 and a 4CX250?
12. What's the difference between an EL84 and a UL84?
13. What's the difference between an AC107 and a BC107?
14. What's the difference between CTS and RTS?
15. What's the difference between PC-DOS and MS-DOS?
16. What's the difference between a triac and a thyristor?
17. What's the SSB power limit on 50MHz?
18. What's the CW power limit on Top Band?
19. Who owns Cellnet?

20. What does ETACS stand for?
21. How fast is V22bis?
22. When's the next SAREX?
23. When's the next WARC?
24. When was the last JOTA?
25. When was the first JOTA?
26. You are given a transformer with a 12-0-12V secondary winding which you propose to use in a power supply for your shack:
 - a) assuming that you require a regulated 12V DC output, what rectifier configuration would you use?
 - b) what value of peak voltage would you expect to see across the reservoir capacitor?
 - c) given the choice of anti-surge, standard or quick-blow fuses, which would you use in the transformer's primary circuit?
27. You wish to keep a sked on 7MHz with someone living 300 miles due north of you. You erect a dipole about 20' off the ground but you're forced to run it due north-south because of the shape of your garden. Will this matter?
28. You buy a 100W transistor amplifier for 144MHz at a rally. What power output will you run it at on SSB?
29. You read an article in a magazine about making a QQVO6-40A amplifier for 144MHz and the author says it will run 100W PEP

- output on SSB. In the sense that an RF power meter connected to the amplifier would read 100W if you drove it hard enough, that's true - but your locals will probably petition the DTI to have your licence revoked if you try it, since a lot of the 100W will be in high-order IMDs. What's a more reasonable output power for a 6-40 amplifier used for 144MHz SSB?
30. What is Thévenin's Theorem?
31. What is Lenz's Law?
32. What things are linked by the Left-Hand Rule?
33. Give the shortest possible rendition of Murphy's Law
34. What's a 7447?
35. What's a 4049?
36. What's a 6C4?
37. What's a 150C2?
38. What's a 2C39?
39. What's an ORP12?
40. Of which two metals is ordinary solder an alloy?
41. Of which metal are the laminations of a conventional transformer core usually made?
42. Of which substance is the core of a toroidal transformer usually made?
43. If the steelwork of your new tower sections is said to have been 'galvanized' which metal was principally used in the process?
44. You live in Potters Bar and wish

- to work a DXpedition on Kingman Reef. What beam heading will you use, and what is the distance between you?
45. You live in IO94GH and someone tells you that a station in IL27GX is coming through on 144MHz. What beam heading will you look for him on, and how far is it from him to you?
46. When are the Perseids, approximately?
47. When is the 1990 CQ WW CW?
48. Who is the editor of the RSGB DXNS?
49. Who is the editor of the Microwave Newsletter?
50. And finally - the tie-breaker. How many radio-related words can you get out of the words MERRY CHRISTMAS?

Well, that lot ought to keep you out of mischief for a while! There are three prizes, all from the RSGB's new range of personalised goodies. Third prize is a quality fleece sweatshirt, and second prize is a machine washable lambswool sweater; both of these are available in a variety of colours and sizes, and they will be embroidered with the winners' names and call signs.

First prize is the 'ham bear' seen warming his paws on the left of the roaring log fire on this month's cover; he comes complete with headphones and a very natty jacket embroidered with the winner's call sign and RSGB logo. When one of these bears was brought into HQ, everyone immediately fell in love with him, and he was treated to a guided tour of Lambda House... perhaps you could give him an even better home!

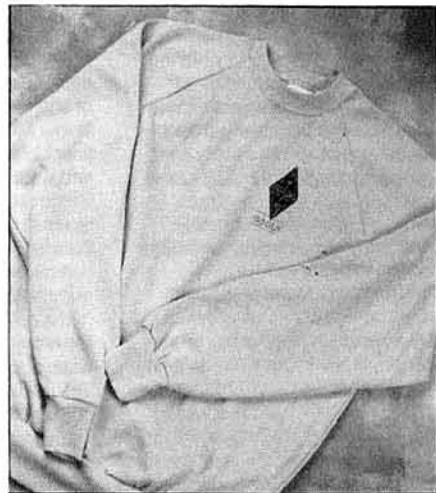
Send your entries to RSGB HQ, marking your envelopes 'Christmas Quiz.' Entries must reach us by Friday 19 January 1990.



FIRST PRIZE



SECOND PRIZE



THIRD PRIZE



Most Shambolic Shack in Britain Award



And now, we proudly present the results of the prestigious 'Most Shambolic Shack in Britain' Award — and we must say right away that the standard of entries for this contest was extremely high. A grand total of 153 entries were received and the judging panel had considerable difficulty in whittling these down to a short list of 10, from which the final selection was made in secret conclave earlier this month, amidst strict security and copious quantities of RSGB coffee.

Criteria were strict, and the marking system was extremely complex; a large number of factors needed to be taken into consideration. Many entries lost points because there was distinct evidence of shelves having been properly fitted in the shack at some time or other, some of which were actually straight - visible shelving either had to be sagging noticeably or distinctly *not* parallel to any walls, ceilings, etc. Marks were also lost because in several instances multiple shelves were obviously parallel to one another, although

not necessarily parallel to the floor or ceiling; this was clearly unacceptable. Shelves formed from random lengths of wood resting on items of equipment of dissimilar heights were preferred by the judges. Shacks in which there was evidence of at least two and preferably more layers of equipment stacked *without* benefit of shelving were also viewed with favour. More seriously, too many shacks had fully carpeted floors and were summarily rejected. Carpeting is acceptable in small quantities, but covering the entire floor with it demonstrated a concern with luxury which was quite out of keeping with the spirit of the contest. Equally, there were too many instances in which no wires at all were visible on the floor. This was deemed to demonstrate a concern with tidiness which lost many marks. Those shacks in which the floor was not visible at all, being covered with reels of cable, old chassis, transformers, etc, did better in the final scoring.

Other reasons for loss of marks

included the following: equipment placed parallel with the edges of tables, walls, etc; two or more items of equipment placed neatly next to one another; windows with curtains; windows through which no wires or feeders were seen to pass; no visible evidence of used coffee cups, plates or other crockery; the presence of anything resembling a comfortable chair (although those shacks in which the chair merely formed another surface on which to rest equipment received bonus marks); use of purpose-made drawers for component storage (biscuit tins, etc, were preferred); the provision of a waste-paper bin or other rubbish receptacle; and the presence of any fan heater, radiator or other heating device unless it was obviously incapable of any form of functional operation.

So now to the judging. In **third place**, with 707 out of a possible 1000 points, was **Mr G Eddowes**, G3NOH, of Ealing (Picture E).

This is a fine effort, although marks were forfeit as a result of the disappointingly small amount of

'sag' visible in the shelves and the clear presence of curtains; much of the equipment also looks suspiciously neatly mounted on the said shelves. A few marks were also deducted because a copy of *Practical Wireless* is visible; the presence of copies of *Radio Communication*, or better still something completely unrelated such as *Practical Motorist* or *Gardener's Weekly*, would have avoided this. In mitigation, the judges noted the excellent use of the chair as a resting-place for an amplifier and the biscuit-tin storage system visible at centre-right; there is also a used plate on the extreme left of the workbench, which was unanimously praised. A fine effort, for which Mr Eddowes will receive the third prize of an apron.

In **second place**, with a well-deserved 877 out of 1000, is **Mr C B Searle**, G4LST, from Great Torrington in Devon.

This is a very fine example indeed of a thoroughly shambolic shack, which failed to secure first place only because of (a) the soft-topped

chair, which is clearly not used for equipment storage, (b) the fact that a good deal of equipment is - despite the splendid clutter of wiring - parallel to the edge of the workbench and (c) that the stack of magazines on the right of Picture C is far too neat. However, the judges were impressed by the can of Jeyes Fluid visible at bottom left of Picture D and the lack of luxury items such as carpets, curtains, heating, etc. A very good effort indeed, for which Mr Searie will receive an exclusive RSGB designer dustpan and brush (a prototype of which has been tested in the RadCom office).

And finally - the undisputed **winner** of the Most Shambolic Shack in Britain Competition. With a whopping 944 out of 1000, just look at this magnificent entry from **Mr John Eley, G3LMR**, of Glenfield, in darkest Leicestershire.

This excellent entry was marked down only because of the multitude of component drawers visible in Picture B, thus demonstrating a fatal propensity for neatness on Mr Eley's part; also, the 13A sockets visible in the same picture appear to be equally spaced from one another. The stool also has a soft cover, which is hopelessly out of keeping with the general *ambiance* of the shack. However, the exquisite shambles of Picture A redeems the situation, especially since the only visible seating is occupied by Mr Eley's cat - thereby additionally demonstrating a proper sense of priorities. The judges were particularly impressed with the siting of the only visible rig, next to the drilling machine. Note also those splendid shelves, full to bursting and certainly not mutually parallel. An outstanding effort. Mr Eley will receive the first prize of a broom, lovingly carved from the finest materials, fitted with Albanian hedgehog bristles, the whole *ensemble* finished off with a rather *piquant* RSGB motif (it's also mighty useful for waking editors up).

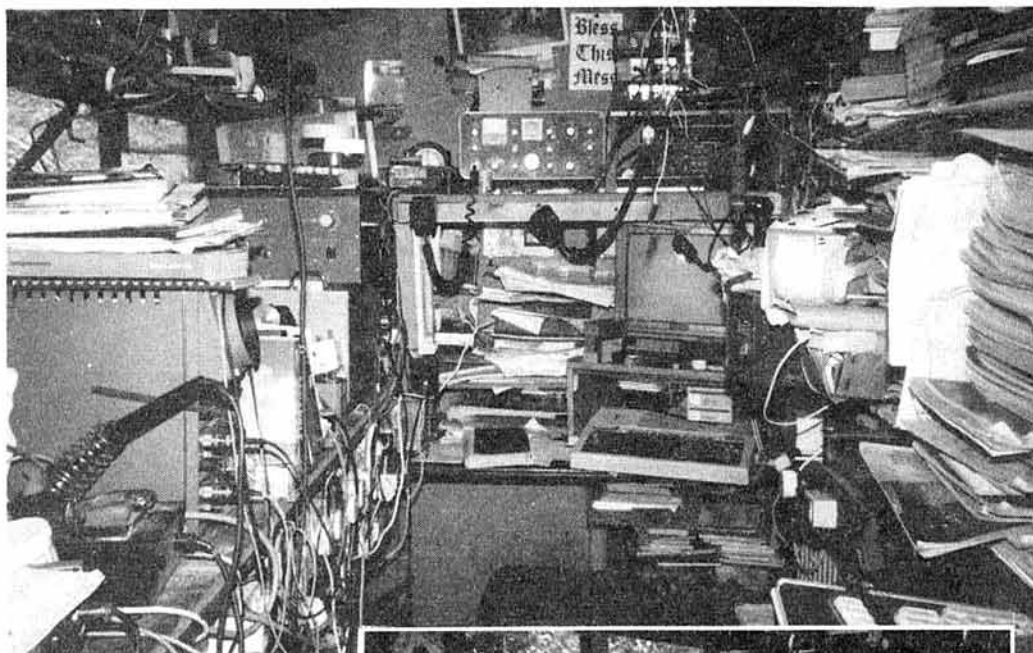
The following were also Highly Commended by the judges:

Mr J E Symes, G3LNN, Walmley, West Midlands - very promising indeed, should do well in future competitions of this nature.

Mr J D Bolton, G4XPP - too much regular shelving and boxes stacked too neatly for the judges' taste but really rather good.

Mr B O'Brien, G2AMV - a fine effort, but again a little too tidy to challenge the very high standard set by the leading entrants.

Mr G Hands, PA3EUS/G0FBG - quite shambolic, and much the best entry from the Continent; should do well in future years.



Ms B Bushell, *ex parte* G0KVA - very shambolic indeed and should score highly in future events. Watch those parallel shelves and quasi-careful equipment placement!

Mr A L Dick, GM0IRZ - an excellent example of the Caledonian variant of the Shambolic Shack, let down by a very comfortable red chair and some neatly placed equipment, neat magazines and the carefully positioned photograph of Nigel Gresley's masterpiece.

Dr A G Gray, G3XQU - splendidly shambolic, let down only by some touches of luxury. Keep trying, and pay attention to that wiring!

All in all, a most satisfactory contest; thank you all for taking the trouble to send in your photographs, and again we congratulate the winners on a splendid effort.



Pictures A (far left, top) and B (left, inset): the winning shack, belonging to Mr John Eley, G3LMR.

Pictures C (top) and D (above): Mr C B Searle, G4LST, came in second.

Picture E (below): third place went to Mr G Eddowes, G3NOH, for this fine effort.



SPECTRUM ANALYSIS

HF

JOHN ALLAWAY G3 FKM

Paul, G4XTA, has some views on behaviour on the bands and says "Following recent correspondence on the alleged bad behaviour of European operators in DX pile-ups, a view from this side is needed to balance the discussion. I am an active DXer and, like most others, I appreciate the efforts of DXpeditioners in activating rare countries for us. However, let us not forget that the motives of such operators are not entirely altruistic.

"Many of us dream of becoming 'rare DX' and a large part of the reason for mounting a DXpedition is the pleasure derived from the international fame, and the drawing of massive attention to the operators on the bands. We Europeans accept our lowly position and patiently sit in the pile-ups for hours (or even days) tolerating conditions akin to animals in a sheep-dip.

When the DX operator starts to become intolerant of the great noise he has created, however, it all starts to wear a bit thin. Perhaps we too are becoming tired of the disparaging comments and lambasting some of these DX 'prima donnas' mete out to those of us unlucky enough to live in Europe. Let us remind them that it takes two to QSO and that the success of their operation also depends on the world's willingness to talk to them. So - come on guys, you'll be back home amongst the rest of us one day. Be nice to us!"

Alan, G4NXG/M, has 258 countries worked /M and is still trying to find out the record DXCC score achieved by a mobile station. Does anyone know?

Very best wishes for the festive season - and thanks to all for the support during 1989!

TABLES

There will be some changes to the tables next year and G3GIG is proposing the following - (1) New tables start from the 8 January entries with no carry forward from previous tables. (2) All participants will require at least one QSO on each of the eight bands (i.e. the previous six plus 18 and 24MHz). An exception will be made in the case of mobile stations where top band contacts will not be required. (3) The entry point is a minimum of 500 total band countries. (4) After three consecutive failures to update a call will be dropped from the table, but may be reinstated on further application. (5) In the case of obvious errors in submissions, the right to exclude them is reserved. There will be no 'in year' or 'with deleted' tables and all tables will be for current countries only, and there will be a completely clean start beginning from 8 January.

DXCC ON 10MHz

Having gained approval at the IARU Region 2 Conference a few weeks ago ARRL will now accept QSLs for contacts on 10MHz for credit for the CW, mixed and RTTY DXCC awards. There are no date restrictions. There will be no single-band award and 10MHz contacts are not valid for 5-band DXCC. ARRL asks us all to try to avoid interference to the stations of the Fixed Service with which we share the band - and to remember that we only have it on a secondary basis on the condition that we do not cause interference to the primary users. No QSLs for contacts on phone will be acceptable.

DX NEWS

I am sad to have to report that so many have been writing to the authorities in Mozambique that they have become thoroughly disillusioned with amateur radio. At the time of writing C9MKT's permission to operate had been

TABLE SERIAL No 30							
ALL-TIME BAND TABLE. CURRENT COUNTRIES. No 11							
Call	1.8	3.5	7.0	14	21	28	Total
G3KMA	130	242	307	321	319	305	1624
G3GIG	71	211	266	319	318	320	1487
G3XTT	160	209	259	301	289	265	1483
G3MCS	64	211	259	314	314	294	1456
G4GIR	104	219	260	302	296	274	1455
G4BWP	107	224	260	301	291	271	1454
VK9NS	109	205	259	309	285	250	1417
G4DYO	66	184	233	309	302	283	1377
G3UML	33	221	243	318	292	263	1370
G3XQU	58	183	214	304	287	266	1312
G3ALI	2	223	238	305	278	240	1286
G4OBK	124	156	203	279	248	227	1237
G3TXF	65	161	200	282	253	218	1179
G3NOF	5	98	101	317	318	276	1115
G3IGW	105	148	234	226	190	172	1075
G3YMC	80	110	183	248	252	199	1072
A92BE	40	126	159	290	235	201	1051
GM3YOR	75	140	196	224	206	184	1025 (all CW)
GM3PPE	69	165	170	212	216	163	995
G4ZYQ	1	127	114	229	244	219	934
GM4ELV	36	93	142	189	126	129	715 (QRP)
G0HSD	1	100	105	147	168	161	682
G4NXG/M	1	29	55	193	210	187	675
G3JXN	19	46	104	154	129	191	643
Average	64	160	199	266	253	231	1172

Next deadline - All-Time Eight Bands - Current only (see text) scores to G3GIG by 8 January 1990 please.

1989 THIRD YEARLY TABLE							
Call	1.8	3.5	7.0	14	21	28	Total
G4OBK	49	66	112	99	92	115	533
G3TXF	40	35	102	127	121	99	524 (CW)
GM3YOR	—	35	90	55	89	46	315
G4NXG/M	1	5	28	65	90	115	304
G3SXW	20	29	41	42	38	61	231 (CW)
GM4OBK	4	13	51	19	56	49	192

Last deadline - 8 January 1990.

suspended, but it is hoped that this may only be a temporary ban. I hear that some of the correspondence has been unpleasant and aggressive - surely the worst possible way in which to persuade a country with serious internal problems that amateur radio is a good thing?

Gus, SM5DIC, is in Zaire for a year and is licensed as 9Q5TE. According to *The DX Bulletin* he is to be found near 14.315, 21.315, and 28.515MHz but also operates on CW - favourite times are Saturdays at 1400 and Mondays at 1600. The same source mentions XT2PS, in Burkino Faso who is there for two years. FH8CB should now have left Mayotte and moved to Madagascar. At the time of writing he had verbal permission to operate but no proper licence. ZS3UN/OH7NRW will be in Namibia and on all HF bands SSB/CW until April 1990. I4ALU intends to be in the Maldives at the end of the month. He will be on all bands, CW only, and his call sign is 8Q7BX. ZS6BNS should be in Walvis Bay for up to three years - ZS1IS is a permanent resident. LU5DQ tells me that LU6ELF/D2 is certainly in Angola. His permission to operate was given by the UN

authorities and may or may not satisfy DXCC requirements. The operator's name is Jorge and he is an officer in the Argentine Navy.

HI500UD will be on from the Dominican Republic on 2 and 3 December - this to celebrate the 500th anniversary of the discovery of America. Amateurs on Prince Edward Is are allowed to use VY2 now in place of their former VE1 prefixes. This came as a result of a vote taken by C.R.R.L.

ZL2VS will be on the air from the Tokelau Is as ZM7VS from 15 to 29 January 1990. FD1MGZ is at present on Tuamotu Is where he will stay for about a year. His call sign is FO0MGZ. VK2BCH may still be on Rotuma Is as 3D2XV - SSB only and possibly looking for Europe on 21.295MHz at 0700 - and he should leave on 14 December (try 21.295MHz from 0700). OH2MCN is scheduled to become 3D2VD from Fiji between 23 and 26 December and again from 30 December to 3 January - look for him specially around 7.002, 7.085, 14.025, 14.195, and 21.021MHz. OH2MCN also expects to be on the air from Western Samoa between his two stays in Fiji.

QTH CORNER

A61AD	P.O. Box 671, Dubai, U.A.E.
D44BS	PO Box 101, Praia, Cape Verde Is.
H44JG	PO Box 461, Honiara, Solomon Is.
JT0DX	via HA6KNB, Radio Club Salgotarjan, Box 115, H-3101 Salgotarjan, Hungary.
NH6RT/KH8	via JH4IFF, M.Uto, 681 Tatsukawa, Sanyo, Akaiwa, Okayama 709-08, Japan.
LX7A	B.Koch, Kohlbeckstr.26, D-8060 Dachau, F.R. Germany.
TT8GA	Box 88, F-35170 Bruz, France.
3D2EA	PO Box 15377, Suva, Fiji.
3D2HJ	WA4HHJ, 328 Cherie Ct, Fort Walton Beach, Fla. 32548, USA.
3Y0B	WA9VGY, 6316 Greenleaves Rd, Indianapolis, Ind, 46220, USA.
9V1YC	PO Box 1265, Singapore.

A number of USSR stations have been appearing with LY prefixes and they are in fact in Lithuania (UP). Estonian amateurs are expected to begin using the ES prefix series in the near future. I have also heard that some of the Soviet islands have been given prefixes. 4K1 will continue to be Antarctica, Franz Josef Land is 4K2, European islands 4K3, and Asiatic islands 4K4.

EXPEDITIONS

The latest update (mid-October) on the US visit to **Bouvet Is** is that it is set to begin about 2 February and continue for 10 days. Seven individual stations will be used - three on SSB, three on CW and one on satellite. Each HF station will use an FT1000 and FT767GX transceiver. There will be separate Yagi and vertical antennas to cover all bands 1.8 to 28MHz, including 10, 18, and 24MHz. There will be special emphasis on the LF bands, with 7MHz SSB operation from 1900 throughout the night. All stations will use the callsign 3Y0B, and the frequencies likely to be

28MHz COUNTRIES TABLE

G4MUW	191 (SSB)
G0CKP	178 (CW)
G4DXW	166
G4ZYQ	165
G0IHB	159
GM4ELV	152 (QRP)
G4XAH	134 (SSB)
G0JSM	126
G4NXG/M	124
G0JHC	120
G4OBK	115
G2AKK	112 (CW)
G0BXQ/M	109
G4SJK	101
GD4TT	98
GM4OBK	74
G3SDK/M	54
GM4CHX	54

used for transmitting and listening are 1.825 (1.835+), 3.505 (3.525+), 3.695 (3.800), 7.005 (7.025+), 7.055 (7.200 - presumably another frequency for Region 1 stations!), 10.105 (10.125+), 14.005 (14.025+), 14.145 (14.200+), 18.070 (18.080+), 21.005 (21.025+), 21.195 (21.300+), 24.905 (24.925+), 28.005 (28.025+), and 28.295 (28.450+). There will be no phone operation on 10, 18, or 24MHz. Every SSB station will

announce the bands and modes of the other stations active during each 40th QSO. CW stations will not answer questions. Only whole call signs should be given - not the popular 'two letter' type so prevalent nowadays. Tail-ending will be accepted, but only if it does not cause QRM to the station being worked. There will be very little zero-beat operation. QSLs go to the address in QTH Corner and direct cards will be answered in the order in which they are received. Bureau cards will be dealt with next summer. An attractive 8x10in award will be given to anyone working or hearing 3Y0B on three or more bands. (Late flash - just as this was being sent to the editor, a notice came from the US saying that Marti Laine, OH2BH, will also be going with the 18-man group and that RTTY will be available - check 14.088, 21.088, and 28.088MHz and call on 14.090-095, 21.090-095, and 28.090-095MHz.)

An update on the proposed SM7PKK expedition - he now expects to be on **W.Samoa** as 5W1HK until 5 December then go to

Rotuma Is between 16 December and 6 January. After that he hopes to visit **Tuvalu** between 10 and 23 January, and then **W.Kiribati** from 25 January for a period.

A group of Americans was due to be touring Asia and may still be at the last scheduled stop in **Hong Kong** or **Macao** although they were due to finish on 2 December.

Iris and Lloyd Colvin, W6QL and W6KG, are scheduled to start another YASME tour beginning in **Burkina Faso** where they were supposed to be in late October. From there they will go to **Niger** and might well have already arrived.

AWARDS

Worked All Liberia Award
With the establishment of three new counties in Liberia, it has been necessary to modify the rules for this award. The requirement now is to submit satisfactory evidence of having conducted two-way communication with at least one station in at least nine of the thirteen counties, using at least three bands and any mode, since 15 March 1962 (only nine contacts

HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 1989

The time is represented vertically at two-hour intervals 00(00)GMT for each band, ie 00=0000, 02=0200, 04=0400 etc. The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz columns.

Time / GMT	28MHz	24MHz	21MHz	18MHz	14MHz	10MHz	7MHz	3.5MHz
	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802
** EUROPE								
MOSCOW	...8+...6...	...99998...	...99999...	...2988995...	11.687789931	764765467987	886532235788	++42...255+
MALTA	...8+9971...	...99999...	...99999...	...9889993...	12.487779983	773754458998	888631125898	+++3...25+
GIBRALTAR	...298872...	...59994...	...89997...	...9889993...	...87778982	563275457998	888752224799	+++2...4+
ICELAND	...6997...	...89991...	...19995...	...39997...	...1.7888994...	464.76668885	887453345788	55542...24+
** ASIA								
OSAKA	...73...	...85...	...97...	...2871...	2.2754112.3	1...42234635	...1...13672	...34...
HONGKONG	...+82...	...18994...	...178871...	...677831...	1...3556752...	2...2236882	...13675	...342
BANGKOK	...2+...+6...	...27998...	...488991...	...277894...	2...4468833	3...1136897	...13677	...344
SINGAPORE	...289996...	...37998...	...1488992...	...177895...	1...5468842	2...136886	...13675	...342
NEW DELHI	...3+...+8...	...468991...	...37894...	...115787...	2...2468333	73...136788	62...13677	3...344
TEHERAN	...4+...+6...	...678998...	...758993...	...63368961...	3114...368953	8641...136888	762...3677	4...344
COLOMBO	...3+...+7...	...3589981...	...1158994...	...368971...	31...368953	62...136888	4...3677	2...344
BAHRAIN	...4+...+95...	...6678972...	...6347895...	...1.512689821	5212...368975	873...36888	761...3678	43...345
CYPRUS	...1+...+82...	...4999994...	...7888981...	...1.877789941	541754578986	886521247999	7862...24788	553...4+5
ADEN	...4+...+83...	...56689951...	...523589841...	31.3.1389963	7511...58997	883...25888	761...3677	44...344
** OCEANIA								
SUVA/S	...4673...	...6885...	...288981...	...477893...	...755685...	...1522363...	...12...131...	...21...
SUVA/L	1...44311343	1...66532553	...87665741	...18657782...	...4733576...	...241.253...	...1...21...	...2...
WELLINGTON/S	...37862...	...58874...	...88887...	...877882...	...175584...	...422363...	...1...13...	...2...
WELLINGTON/L	...187885...	...29897...	...3888991...	...5321231...	...1632354...	...41.242...	...1...2...	...2...
SYDNEY/S	...187885...	...29897...	...3888991...	...5321231...	...1632354...	...41.242...	...1...2...	...2...
SYDNEY/L	...377766...	...4688881...	...2488894...	...76432441...	...5434573...	...2123451...	...23...	...32...
PERTH	...377766...	...4688881...	...2488894...	...76432441...	...5434573...	...2123451...	...23...	...32...
HONOLULU	...377766...	...4688881...	...2488894...	...76432441...	...5434573...	...2123451...	...23...	...32...
** AFRICA								
SEYCHELLES	...3567643...	...44578661...	1...212588841	31...389973	74...58998	85...25889	73...3667	4...344
MAURITIUS	...35788841...	...33579972...	1...1.1589952	41...279985	84...58998	83...25889	51...3677	2...344
NAIROBI	...27788862...	...455689841	31.522379984	63.3.169997	9711...37999	883...5888	761...2678	44...344
HARARE	...145678741	1...244579973	52.311159996	75.2...38998	981...6999	873...3899	751...1677	42...354
CAPETOWN	1...55668862	31...44458985	63.221127998	86.2...17999	9821...2799	883...589	751...268	42...354
LAGOS	1...+...+89973	31...97569986	74.173238998	97.361.17999	9946...4899	8885...1699	7782...377	445...55
ASCENSION Is	1...78767643	21...86556875	64...86226898	871.71.1799	99634...589	88861...279	7773...57	444...25
DAKAR	...7+...+962	1...88658985	43...96226898	762.84.3899	977171...1699	88864...389	77761...157	4443...24
LAS PALMAS	...6+...+83...	...8999951...	...99889983	221.98778996	775186546899	999663213699	888631...1478	+5+4...4+
** S. AMERICA								
STH SHETLAND	...35554442	1...66666554	43...87644467	652.86421246	6751631...14	355431...1	1222...	...332...
FALKLAND Is	...25567662	1...57655574	32...77421257	652.862...37	787173...15	6885421...2	36651...	...344
R DE JANEIRO	...27645852	...58544574	32...76211387	642.84...178	987171...48	88854...16	78752...3	4442...
BUENOS AIRES	...35546652	...67543464	111.8831.156	533.871...37	887.74...46	788541...3	78752...	2442...
LIMA	...+...+751	...2965532	1...24832235	213.4661.16	767.753...5	688521...2	4672...	343...
BOGOTA	...+...+775	...965562	1...2832255	213...461.36	757.54...6	8885321...3	66762...	3343...
** N. AMERICA								
BARBADOS	...6+...+851	...7865772	1...8721375	313...75.168	767.252...38	8885421...16	76662...	4343...
JAMAICA	...9+...+74...	...976551	1...1852254	213...372.36	757.354...6	8885421...16	66762...	3343...
BERMUDA	...2+...+84...	...5977861	1...7854684	213...7732477	7571354...158	8885421...26	66652...	4332...
NEW YORK	...8+...+83...	...199885	...3886772	212...5764575	88754211.26	88754211.26	66652...	4332...
MEXICO	...+...+72...	...9763	...285222	112.2.472.13	55716245...3	58855212...	26662...	343...
MONTREAL	...8+...+82...	...199994	...4887872	112...6776774	557145453467	88755212.136	66652...	4332...
DENVER	...3971...	...5972	...78641	112.1.77442	567151164114	588552131.2	36652...	342...
LOS ANGELES	...86...	...971	...1862	122.11.37421	467.52.551.2	378552132...	15652...	342...
VANCOUVER	...24...	...46...	...782	122.11.18741	466.53.37543	47852134212	24652...	342...
FAIRBANKS	...1...	...1...	...11124...	131.2323461	475.55457853	567352235654	24552...12322	32...

The provisional mean sunspot number for October 1989, issued by the Sunspot Index Data Centre, Brussels, was 158.5. The maximum daily sunspot number was 209 on 5 October and 16 October, and the minimum was 97 on 27 October. The predicted smoothed sunspot numbers for December, January, February and March are respectively: (classical method) 169, 164, 160 and 156; (SIDC adjusted values) 178, 173, 168 and 162.

needed). Send a certified list of QSOs - signed by an officer of a national society or two other amateurs, plus US\$5.00 or 10 IRCs to Awards manager, PO Box 10-0987, 1000 Monrovia 10, Liberia.

USSR DX Club Award

For contacts or confirmed reports since 1 January 1988 with members of the USSR DX Club. Each may be worked once for one point and Europeans need 15 to qualify, as do Asians. Africa and the Americas need ten and the rest five. Send certified application and 14 IRCs (rather a lot?) to Award Manager, RSF of USSR, PO Box 88, Moscow.

CONTESTS

The 1989 ARRL International DX Contest results have now appeared and the leading UK scores in position order are as follows:

Single Operator CW Section — G3FJB, 2,707,848 points; G3SJK, 1,084,332; G4BUO, 504,900. Multi-operator CW Section — GM3ZAS, 71,145. Single Operator Phone Section — G3SJK, 1,024,884; G2QT, 632,142; GM3BCL, 259,869. Multi-operator Phone Section — G4SDP, 2,356,392; G0KBB, 1,004,400; GB5DX, 131,100. All scores are for all-band operation.

BAND REPORTS

The G8KG report this month reads as follows: "The combination of seasonal improvement, high solar indices, and a mostly quiet geomagnetic field resulted in an excellent spell of F2 propagation in late September and the first half of October. This period included the RSGB 21/28MHz Contest, for which conditions were very good, and MUFs were at their highest around 14th and 15th October when the solar flux was 225 SFU and the Boulder A index hovering between 0 and 1. At the time of writing (22 October) the good spell had been interrupted by major flares from a previously relatively quiet side of the sun which caused severe geomagnetic storms on 20 and 21 October.

"SIDC's provisional sunspot number for September was 176.8, the highest this year but a little below the value for December 1988. The final monthly average solar flux was 226 sfu, rather lower than in January and June, and it looks as though the average for October will be in the region of 210-220 sfu. For readers who would like to update the graph which appeared in last month's report, the next firm point is 208 for month 35 while month 36 looks likely to be close to 220. This will put the cycle a little ahead of Cycle 19 but for the next few

months the trend should be steeply upwards."

Now, as usual, to the loggings. The contributors this time included G2s AKK, HKU, G3s GVV, KSH, YRM, GM4CHX, G4EHQ, GM4ELV, QRP, GW4KGR, G4s MUW, NXG/M, GM4OBK, G4s OIL, SJG, ZYQ, G0s AML, CKP, and GW0GPQ. CW stations in italics.

3.5MHz

2100 JA2KIW.
2200 A61AD.

7MHz

0000 FJ/DL7FT.
0300 A92BE.
2200 JT0DX
2300 CE0OGZ

14MHz

0100 HK0TEN.
0300 LU1ZA(S.Orkney) KH2/
NY6M, KN00/KH3, VK0GC,
ZY0RC, FO0MGZ, KL7HS,
UW1ZC/UA10 (N.Zemlya).
0900 K2HRJ/KP1, ZK1CQ.
2000 OH4ML/H44, JT0DX, ZS3/
DJ2SX.
2200 FJ/DL7FT, 3X1SG.

18MHz

0600 VK2,3,5,7, W6, ZL.
1200 ZL2APW.
1800 VS6AT, ZD8VJ.
1900 AL7I, J6LMV.
2200 JA2NVY, W5, W7.

21MHz

0700 AH6AB, BY5SY, FO0BMA,
KC6KF, P48ADI, UA1OT.
0800 BY5s RY, VZ, YJ8AB, ZD7VC.
0900 BY1PK, KH6FS, PY0FF,
YJ8NMB, 4K0F.
1000 YK1AA.
1100 FK8FA, OH4ML/H44.
1300 JT0DX.
1500 BV2DA, HS4ANH, VQ9DM.
HL5BDS.
1700 XX9SW, ZS3/
SMOKV, 3DA0BK.
1800 A61AD, AH6GY, FR9A,
HS1BV, KL7GY, VK4DCO.
1900 A61AC, SU1ER, ZY0FA.
2000 S92LB, ZL4GA.
2100 D2/LU6ELF, VK9NS.
2200 HL5BDS, PA0GAM/ST2.

24MHz

1300 ZD7CW.
1500 KL7CYL.
1600 HZ1AB, VU2ZAP.
1700 CN8MC, K7NN, PY, VE1, VU,
Z2.

28MHz

0700 3B8FQ.
0800 BY1PK, BY5RA, WA7VVA/
KC6, FK8FG, H44JG, JT0DX,
TR8ZA, VK9NS.
0900 A61AD, BY5TS, FT4ZE, KH8/
NH6RT, S89DX, XX9SW,
YJ6AB, ZD9BV, ZL, 3D2HJ.
1000 H44JG, HLOX.

1100 A7AJ, BY8AC, KD7P/NH2,
KH0AC, R0Y/UA9YX, TT8GA,
G3GJQ/5N29.
1300 TL8A, VK6NV, W6-W7,
ZY0FA.
1400 TU0A, VS6WV, Y11BGD.
1500 FJ/DL7FT, JY9IU, XT2MX,
3X1SG.
1600 D68WB, HL5BDS, XF3RD,
ZS8MI.
1700 FH8CB, VP8BZR.
1800 AL7BL, FJ/DL7FT, KH6s,
KL7XD, OX/K7ANW, V44KI.
1900 V29OA.
2100 FY5EM, VP5VOE.
2200 VK3AKK.

Thanks to the following for information - the *DX Bulletin* (VP2ML), *DXNL* (DL3RK), the *Long Island DX Bulletin* (W21YX), *DX News Sheet* (G4DYO), the *Ex-G Radio Club Magazine* (WA8GTA), the *Lynx DX Group Bulletin* (EA2JGO), *DXpress* (PA3CXC), and *CQ Magazine* (W1WY).

Everything for the January column must reach me by 27 November please - early because of the Christmas season.

VHF/UHF

NORMAN FITCH G3FPK

The main news this month is all about the excellent tropospheric propagation at the beginning of October, featuring 144MHz contacts with the Faeroe Islands. There were also 50MHz F-layer contacts between the British Isles and Australia, Japan and Guam from 11 October, together with useful auroras on 26 September and 20/21 October.

BEACON NEWS

The PA in the TX of the 70cm beacon GB3CTC (CNL) has been repaired and it is now QRV again on 432.970MHz. GB3CTC on 50.042MHz had to be taken out of service due to intermodulation problems with other services on the site.

GB3REB (JO01GK) on 70.040MHz is a new beacon in Chatham (KNT) and it runs 10W to a two-element Yagi beaming north-west. The Call Book lists G3ZYV as its keeper. GB3WHA on 432.810MHz has been QRT for a long time, but it could become operational again from a new site in the south-east.

Alan Docherty, G18YDZ (ATM), is the keeper of beacon GB3NGI (IO65PA) on 50.057MHz. He writes: "The beacon has been running for over a year now. I would like to know how useful it is in the UK because I had thoughts of changing the present NW/SE dipole for a Yagi array in the direction of the States."

He requests feedback from band users, either direct or via VHF/UHF.

Derek Hilleard, G4CQM (SRY), reports that Don Whitty, VO1QF, a recent convert to VHF, has permission to install a 144MHz beacon at a prime coastal site in Newfoundland - the proposal being to point its RF towards the UK. At present this is just a local club effort, but could it be one which the Canadian Radio Relay League would care to consider backing? To date they have installed a small hut to house the equipment and are acquiring the hardware.

We discussed this project at a recent meeting of the VHF Committee, but we rejected the idea of a complementary QRO beacon over here. If the Canadian idea gets off the ground, some dedicated monitoring stations would be needed on this side of the Atlantic. Positive results could occur through tropo ducting over the sea - as already proven on the EA8 to GD, GI and GM paths - double-hop Sporadic E, or auroral E.

Brian Bower, G3COJ (BKS), the IARU Region 1 beacon coordinator, knows from long experience that many such beacon proposals fall by the wayside, so he will not consider any frequency recommendation until the project is all licensed and ready to go.

BAND PLANS

The VHF Committee regularly reviews the band plans and the following recommendations were agreed during our October meeting. **50MHz:** re-instatement of 50.200MHz as the general calling frequency as this seems to be what a majority of users want.

Introduction of 50.185MHz as a crossband calling frequency.

70MHz: confirmation of 70.325MHz as a packet radio frequency, this being already in use in some areas as a "DX Cluster" disseminating information to HF DXers. Assigning of 70.4875MHz to packet radio for linking purposes.

144MHz: designation of 144.650MHz for mailboxes and of 144.625 and 144.675MHz for packet radio. It was felt unnecessary to be any more specific about packet radio, it being up to packeteers to use these frequencies sensibly and efficiently.

The topic of 12.5kHz FM channel spacing on 144MHz has been considered for years. A recent *RadCom* survey, conducted by Steve White, G3ZVW (LDN), revealed a fairly even split between the definitely pro and anti groups. However, a significant percentage of members didn't mind if the standard was 12.5 or 25kHz.

Therefore, the proposal is to phase in 12.5kHz from January 1991. No doubt suitable filters will be made available to upgrade the more recent 25kHz models for both the DIY fraternity and the dealers.

1990 CONVENTIONS

The preferred date for the 1990 VHF Convention at Sandown Park could not be realized and Geoff Stone, G3FZL (LDN), has confirmed that it will now be held on Saturday 12 May. Lecture planning is underway and Ray Cracknell, G2AHU (HWR), has suggested a talk on DX and the Solar Cycle, while Angus McKenzie, G3OSS (LDN), has offered to talk about the problems of disabled operators. The Society's VHF Manager, David Butler, G4ASR (HWR), will be able to review the results of the IARU Region 1 Conference, scheduled for April in Torremolinos, Spain.

At the VHF Convention - and on the VHF Committee's stand at the Birmingham NEC Exhibition on 21/22 April 1990 - it is planned to provide facilities for testing and setting up the deviation of FM transmitters. In view of the proposed change to 12.5kHz channel spacing on 144MHz, these should prove very popular.

VHF AWARDS

From Hal Lund, ZS6WB (KG44), comes the "50MHz DX Report" dated 30 September. I see from this that there is the Southern Africa Six Metre Award which requires proof of contacts with at least ten different squares on the continental African mainland, south of the equator. Starting date is 1 January 1986. You can either submit the QSLs "or send photocopies certified by a representative of your national amateur radio organization." The cost is five IRCs and applications should be sent to the VHF Awards Committee, Pretoria Branch S.A.R.L., P O Box 1259, Pretoria 0001, Republic of South Africa.

The Bredhurst Receiving and Transmitting Society is running the 'Bratruh Six DX Competition' throughout the whole of 1990. It is apparently designed to promote the construction and use of the Bratruh Six AM transceiver, which is a club project. See the News pages for further details (*er - we haven't received any yet - Ed*).

METEOR SCATTER

There are three good showers during the next few weeks, starting with the reliable Geminids - RA/DEC 112/33 degrees - which should peak on 12/13 December. Its radiant is above the middle UK

ANNUAL VHF/UHF TABLE
January to December 1989

Callsign	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total Points
	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	
G1SWH	75	26	72	7	97	22	55	9	-	-	363
G8LHT	61	17	36	5	94	29	52	15	9	4	322
G6HKM	61	30	-	-	80	28	50	16	26	8	299
G0IMG	66	25	41	5	56	12	27	5	-	-	237
G4XEN	24	9	23	4	76	31	39	11	-	-	217
G1DOX	30	6	47	6	59	16	27	3	13	2	209
G4PIQ	-	-	-	-	88	34	53	20	-	-	195
GD6ICR	8	4	34	5	54	12	40	7	8	4	176
G8PYP	35	23	-	-	52	25	24	10	-	-	169
GM1SZF	41	11	-	-	71	16	7	6	-	-	152
GM4CXP	28	11	4	1	60	19	4	3	-	-	129
G8XTJ	40	14	-	-	54	13	-	-	-	-	121
G0EVT	24	19	-	-	39	26	6	6	-	-	120
G3FPK	-	-	-	-	77	26	-	-	-	-	103
GW4FRX	-	-	-	-	65	32	-	-	-	-	97
G4OUT	-	-	27	5	41	18	-	-	-	-	91
GJ6TMM	28	12	-	-	23	9	1	4	-	-	77
G7CLY	-	-	-	-	54	14	4	1	-	-	73
G4TGK	-	-	-	-	50	16	-	-	-	-	66
GM0JOL	-	-	-	-	44	11	-	-	-	-	55
G6ODT	-	-	-	-	-	-	36	10	-	-	46
G0HDZ	-	-	-	-	38	7	-	-	-	-	45
GM1ZVJ	4	3	-	-	24	13	-	-	-	-	44

Do not include EI countries. British counties are the 79 listed in the January Radcom. Up to three different stations allowed in all 12 GM regions. Countries are the usual DXCC ones.

horizon between 1630 and 1230, the number cruncher suggesting the following prime times for skeds: NE/SW around 00 and 07; E/W around 02 with small "bumps" around 09 and 19; NW/SE around 05 and 21; N/S around 06 and 22.

Next, the Ursids - RA/DEC 217/76 degrees - on the 22nd, available all day and offering long periods when the reflection efficiency exceeds 50%. Best times: NE/SW 09-24; E/W all day; NW/SE 17-08. The N/S direction is rather poor, never better than 40% efficient, peaking around 03 and 14. This is a short-duration shower which peaks every 13.5 years, the next maximum being 1999.

Lastly the Quadrantids - RA/DEC 230/48 degrees - on 3/4 January, another 24 hour shower which can be quite spectacular. The efficiency graphs look somewhat irregular, prime times being: NE/SW around 14, with a lesser peak at 06; E/W, averaging 50% 15-03; NW/SE around 03, with a smaller peak at 12; N/S, two big peaks around 04 and 13. With a ZHR of about 100, if your sked catches the peak (probably around 1630 on the 3rd according to the prediction program by AD1C) you should be on a winner.

SOFTWARE

A reminder that I have a number of useful amateur radio programs in CP/M Plus, specifically for the Amstrad PCW8000 series computers. These include the usual locator, distance and bearing, satellite and MS data programs, plus EME planner, DL6WU Yagi design, HF propagation forecaster and so on. The latest addition is a

greyline one for HF and 50MHz buffs, and I'm currently writing one to print out beacon details, bearings and distances from any given QTH. Please send an SASE for a copy of the latest list.

TURKEY ON 50MHz

Dave Court, G3SDL (KNT), operated from Antalya (KM56) using the call TA4/G3SDL and was very successful; he managed 109 QSOs with 14 countries. The station ran 50W from a Tokyo High Power line-up loaned by SMC Ltd. The antennas were a five-eighths wave JVL vertical and a two-element HB9CV on the roof of a five-storey hotel.

Operation commenced at 1545 on 29 September, the first contact being with ZS3AT (JG87). There was daily activity (except for 5 October) until 1820 on the 9th, most QSOs being by TEP or backscatter modes. The countries worked were A2, FR5, LU, PY, SV, TR8, Z2, ZD8, ZS3, ZS6, 3DA, 5N, 9H and 9Q5, all of which were firsts from TA4. QSLs should be in the bureau in early December.

50MHz

In his September report on 50MHz reception in Britain, G2AHU concludes that it was a rather quiet month, with Es propagation ending by the 11th. African signals appeared from the 8th from ZS3 and later from EL, TR8, Z2, ZS and 5N. The 19th was a completely blank day with the Ap index up to 82 and there was a good aurora on the 26th.

ZD8MB's contribution to Ray's report makes fascinating reading, with reports of TEP and F2 layer

openings. Several South American countries were worked - including LU - with S9 signal strengths while beaming north. A puzzling one on the 18th was LU5EZT/MM/ZP5; Carlos was on the River Parana, which flows from the South Atlantic, through Argentina, to Asuncion in Paraguay.

At 2315 on the 23rd, Mike heard a voice say "QRZ?" on 50.110MHz. He gave his call and received the reply, "This is VK8RH. You're 4/1 in Darwin, PH57FV." The VK8 was beaming at 30 degrees and ZD8MB at 280 degrees, so it was a long-path QSO - for which the VK's QTE should have been 62 degrees and Mike's heading 299 degrees. He suggests a probable route as VK8/KG6/KH6/PE/PY/ZD8 involving several modes. Possible combinations include TEP/two-hop F2/TEP, four-hop F2 or "...some exotic east-west chordal-hop mode within the high density zones with fewer returns to the ground." Ted Collins, G4UPS (DYN), in his 6m Information notes for October, says that S01A (Saharan Democratic Republic) is ready to go as soon as permission is received; ZC4MK has the logs for the ZC4VHF/5B4 expedition so is the man to tackle for outstanding QSLs; cards for the OH0M (Market Reef) activity were being printed and that all cards would be answered; finally, that SP6GVU is hopeful that Polish amateurs might get permits for the band.

Tony Selmes, G4KLF, has been operating -/MM out of Muscat, in the Gulf of Oman, working into Japan and Indonesia. He uses an FT-690 Mk 2 running 10W to an inverted-V antenna. He is active on CW on the 28.885MHz liaison frequency, and his QSL address is 52 Palmer Crescent, Ottershaw, Chertsey, Surrey, KT16 0HE.

Ted reports that southern African stations/beacons were worked/heard on 2, 3, 7-9, 11-15, 17, 20 and 21 October; he worked JA1UIU at 0846 on CW on the 10th. The Australian opening started at 0920 on 11 October when G4CCZ (SRY), G2ADR (YSN), G4FXW and others worked VK8s GF, ZLX and KTM. G5KW (KNT) was heard by VK3OT at 0932 but sadly no QSO. The VKs were also heard in Manchester, in Rochdale by G4GAI and later by G3ZYY (CNL) who couldn't work out the calls; signals were very weak on the south coast. OH2TI (KP20) heard the G2ADR/VK8 QSO and the VK8s were heard in Denmark. One VK8 reportedly heard the GB3BUX beacon.

A more widespread opening to VK2, VK4 and VK8 occurred on the 12th, between 0820 and 1000. The first of the season's openings to

North America was on the 12th at 1240 when VE1YX worked G4CVI, G4UPS, G4NDG and G3JVL. VK8GF was working G, OH, PA and SM from 0836 on the 13th. Eight JAs were heard from 0743; VK8ZLX was working into IO70 at 0835; there was an opening from KH6 to Cyprus, Malta and Greece from 0825; OH2TI was working into DU3 at 0857; KH6 on SSB was heard at 0950 on 50.125MHz long path, all on the 14th.

On the 15th, JH4IUO and several other JAs were heard from 0743; from 0820 KG6DX was working Gs and SMs; at 0930 KJ6WO/DU3 was working Gs; at 0955 VK8GF was working LA1ZE; at 1648 W7CI was heard via long path (QTE 120 degrees). On the 16th, the SV/KG6 path was open at 0712; JAs, VK4 and VK8 were heard till 0940 with "strange video to the north, very auroral" at 0830, and from 1600 LA/OH stations reported a large aurora.

On the 18th, Ted worked G3GJQ/5N29 (JJ16) at 1349 and TR8CA at 1430. On the 19th at 0920, Arabic FM was heard, then he had QSOs with JH6TEW and JH6IEF (PM51) around 1000; at 1140, 9H1CG worked 8P6s JW and LL; at 1650 ZB2VHF was S9+ for over an hour. An aurora from 1430 on the 20th brought QSOs with Gs and PE1XHD (JO33) followed by reception of beacons ZS3E, ZB2VHF and EA3VHF (JN01) on 50.070MHz. Finally, at 2000 Ted contacted 9H3LF (JM76).

Neil Carr, G0JHC (LNH), comments on the numerous occasions when DX being worked by south coast stations is inaudible further north than about 51 degrees. On 12 October at 0932, he achieved WAC thanks to VK8ZLX, then worked VK8GF in Alice Springs. The latter was S9 for 30 minutes, calling CQ with few takers on what seemed to be a very quiet band.

VK8GF was the only one heard on the 13th, but video from 9M2 and 9M6 was S9 for three hours. Next day Neil worked VE1ALQ (FN65) at 1146 and at 0935 on the 15th he heard KG6DX. All openings were in a very narrow window between 0930 and 0940, and computer analysis shows that to have been "...prime time greyline propagation."

Mike Gotch, G0IMG (ESX), worked VK8ZLX on 12 October and VK8GF the following day. He has heard JAs, KG6 and DU. Dick Hide, G0LFF (SXW), has also completed his WAC with VK8GF and VK8ZLX (PG66) on 13 October. He heard them again on the 16th.

Commenting on the band plan, he reckons that the reinstated 'local/European' calling frequency is too

LOCATOR SQUARES TABLE					
Starting date: 1-1-1979					
Callsign	50MHz	144MHz	430MHz	1.3GHz	Total
GJ4ICD	228	263	119	59	669
G4IJE	227	338	5	2	572
G4VXE	147	162	42	4	355
G6HCV	143	229	—	—	372
G1KDF	139	180	102	37	458
G0JHC	133	48	—	—	181
G3IMV	105	427	124	51	707
G6HKM	104	215	109	46	474
G1SWH	97	140	53	—	290
GM0GEI	94	—	—	—	94
G0LFF	83	153	—	—	236
G4MUT	82	153	93	31	359
G8LHT	79	181	91	10	361
G8PYP	69	98	22	—	189
G4XEN	66	290	111	—	467
GJ6TMM	62	151	47	—	260
G0EVT	58	197	57	—	312
G6MEN	48	—	—	—	48
G6DER	43	183	114	82	422
G1DOX	39	67	12	5	123
G8XTJ	38	116	—	—	154
GM1BVT	25	21	—	—	46
GM1ZVJ	5	41	—	—	46
G4KUX	—	384	120	—	504
G4RGK	—	284	126	51	461
G0CUZ	—	329	73	—	402
G4RRA	—	280	80	—	360
G4PIO	—	261	87	—	348
G4SS0	—	251	95	—	346
GM4YXI	—	340	—	—	340
G4SWX	—	333	—	—	333
G4DHF	—	325	—	—	325
G8ATK	—	143	94	52	289
G0GMB	—	187	99	—	286
G3FPK	—	241	—	—	241
GM4CXP	—	198	31	—	229
GW4FRX	—	226	—	—	226
G4DOL	—	213	—	—	213
G4XBF	—	150	—	—	150
G4TGK	—	137	—	—	137
GM0GDL	—	83	22	—	105
G6UWO	—	41	44	18	103
G1WPF	—	101	—	—	101
G0HDZ	—	64	—	—	64
G60DT	—	—	43	—	43
G7CLY	—	38	1	—	39

No satellite, repeater or packet radio QSOs.
"Band of the month" 50MHz

far removed from 50.110MHz. When he operated from ZB2, nobody seemed to monitor 50.2.

Back to the band plan: if Europeans are looking for stations outside Europe, they should monitor 50.11MHz and use 50.10-50.13MHz for intercontinental QSOs. Those seeking European contacts should monitor/call on 50.20MHz and hold QSOs above 50.13MHz. Please note that intercontinental means 'between different continents' and not, as some seem to think, 'within the same continent' which would be intracontinental.

Tony Crake, G1GVA (BRK), found lots of vision carriers on 7 October and at 1616 worked OK3CM crossband to 28MHz, which was open to North America. The carriers persisted for an hour but no other 50MHz QSOs were made.

John Hunter, G3IMV (BKS), has had no luck working into Japan and finds it much harder to work the long DX on this band than on

28MHz. Still, he can't complain since he did contact VK8s GF and ZLX, TR8CA, assorted ZS6s and 9Hs and FD1NLQ/7X.

Paul Turner, G4IJE (ESX), got the VK8s and thereby completing his WAC, with the satisfaction of having achieved it "...with a fairly modest station." In the aurora on 20 October, he worked 25 stations, mostly PAs, Gs and GWs, at QTE 45-90 degrees. He mentions that Neville Bethune, G3RFS (LDN) has made WAC since May, using a TS-680 running 15W. His original antenna was a 3-element Yagi; the next was a 5-element Tonna product and Paul now has a 6-element home-brew Yagi.

At 0819 on 12 October Paul Kerslake, G4NDG (DVN), heard VK4DMI calling CQ on CW, and VK4DDG, VK2JSR, VK4FNQ and VK8GF on SSB. At 0922 he contacted VK8ZLX and at 1243 VE1YX, then WA1UPD. The 13th brought VK8GF at 0926, then VE2BPY and WA1OHR later. The band was open to JA on the

mornings of the 14th and 15th with evening TEP to South Africa when ZS6WB was worked at 1742; Paul was beaming at 160 degrees, Hal at 45 degrees. VK4s GV and ALM were S9+ on the morning of the 16th. He completed his WAC at 1001 on the 19th with JA6IEF while beaming at 85 degrees.

Friday the 13th was lucky for Ela Martyr, G6HKM (ESX), for she also worked VK8s GF and ZLX. Ian Kyle, G18AYZ (ATM), wrote for the first time. He is QRV from 50MHz to 1.3GHz but finds 50MHz a bit of a disappointment.

Now back to the 'Who worked CX4HS first' saga, prompted by a letter from G18YDZ, with photocopy of a QSL card confirming their QSO at 1302 on 29 March 1989. Is this the end of the story? Stay tuned! Alan lays claim to the first GI/PY QSO completed with PY2DM at 2132 on 24 August 1989. He has 41 countries worked, "...from this very poor QTH on the north coast of GI."

Geoff Brown, GJ4ICD, sent a tape recording of the VK opening as heard in Jersey, and the signal strengths are quite astonishing. Some of the VKs sounded like cross-town locals and were way over S9. By contrast, signal reports to and from G4CVI just across the Channel on the south coast were about S2.

The opening on 12 October started at 0846 with a QSO with VK4DDG - a GJ/VK first - followed by VK4s ZJB, BRG, DMI, ZNC, KU, KJL, RO, FNQ, ALM, JH, FXZ, TUB, FVC, DO, ZAA, DV and VV, plus VK8s ZLX and GF; the event lasted till 0950. VE1YX and K8MFO were worked in the afternoon. The band was lively the next morning from 0735 and weak VKs appeared from 0825, VK8s GF and ZLX being worked at 0910. Three VE1s were contacted from 1137, VE1HD (FN96) being a new square; he was only running 10W to a small antenna. From 1600 there was a TEP opening to ZS and and Es event to 9H.

The 14th was a 'Star Day' starting with a CW QSO with JH4IUO at 0750. At 0900, KG6DX was heard working OH via the short path. At 0929, Geoff contacted JA5GJN/6, then JA6QGG (PM83), and JA6s VVN, TEW, PAC, RJE, IMJ, GKW all on SSB up to S9. This opening ended around 0952, the QTE being 75 degrees. At 0742 on the 15th, a QSO with KG6DX on CW is claimed as a British Isles first; he was audible for an hour working G, LA, OH and PA stations.

Obviously much more is heard in Jersey than further north on the mainland. Some of these beam headings are quite weird and we'd

all like to have some expert analysis of the paths and modes. I think these phenomena may never have been researched by the professionals, so it could be up to the amateur fraternity to do some pioneering work on the subject.

70MHz

The seventh issue of Roger Banks's 70MHz newsletter 'QSB' has been published. It features a 'Who's on Where?' page, a four-page propagation article by G3NAQ, a nostalgia piece by G3KI about the band in the 1960s, some PMR equipment modification notes and the first part of a 50/70MHz transverter project by G1GVA. Contact G4WND (QTHR) for subscription details.

M J Webb, GD6ICR, is QRV on all bands from 50MHz to 1.3GHz. He moved to the island two years ago and now has permanent antennas up at his Peel QTH. He complains that mainland stations only seem to beam to GD in contests to collect points. He called CQ on phone and CW for two weeks with no takers until a contest weekend occurred. So how about looking to GD for a change? He can be reached on the land line between 8am and 5pm on 0624 28196 in the week, and his home number, via the directory, at other times.

G4IJE has now worked 54 stations on FM and still finds the band very enjoyable. G8AYZ is happy to arrange skeds and reckons the band "...is so dead that it makes sensory deprivation seem positively attractive!" He has found that it is a far better band for inter-G working than 50MHz, but asks, "Where is everybody?"

144MHz

In the September VHF/UHF, I mentioned the Es activities of Eddi Ramm, DK3UZ (JO43). He has sent the final report for 1989 which shows some very long-distance contacts. The events covered were on 5, 10, 12, 15 and 17 June and 11, 13, 21 and 22 July, best results being on 21 July with many QSOs exceeding 2,000km. Best DX were UG6AD (LN20) at 2,982km, UL7AA (LN53) at 3,186km and UG6DE (LN40) at 3,299km. To correct the record, it was UB5LNR (KN78) that he worked from his car in JO53 on 22 July.

G1GVA worked GM4DMA/P (JO08) at 1856 on the 4th, after the main opening had all but gone. John Wimble, G4TGC (KNT), also worked him that day. Laurence telephoned me from the Maureen Alpha rig as he was hearing GB3VHF quite well. I called him several times but we heard nothing

of each other, even though G3FPK is only 30km west of the beacon.

Paul Pasquet, G4RRA (SRY), gave me his details on the 20 and 21 October auroras 'on the wireless'. Both events started in the middle afternoon continuing for several hours into the middle evening. On the 20th, reflections were best at 1440-1500 when he worked RB5PA, who then worked Mike Ray, G4XBF (SRY). Paul also worked SP5EFO. On the 21st, peak times were 1450-1526 when he contacted OE3JPC, SP9EWU and UC2LAI (KO22DE) for a new square. Furthest south station heard was HB9QQ.

During a QSO on 14MHz, Laurence Howell, GM4DMA (GRN), and your scribe discussed the aurora of 20-21 October. He said it was probably the most spectacular visual aurora he had ever seen. Directly overhead there was a small, black area of sky through which stars were visible. This was "...surrounded by a waterfall of wonderful colours, like looking into the middle of an exotic orchid". The colours were all shades of red, blue and green, radiating from the centre. There was a dark red region which seemed to be following the Sun, with brilliant white rays like searchlights. The scene was constantly changing, conjuring up pictures of ghostly figures dashing around the sky. Laurence said "...there were stabbing rays of light which seemed to be coming straight at you, making you want to duck."

The event was continuous for 24 hours in northern Scotland, even though the radio aurora did not produce the quantity and strength of signals we enjoyed in the historic March event.

Over the telephone at the time, John Eden, GM0EXN (HLD), described much the same picture at Dunnet Head, so both he and Laurence were lucky in having clear skies. In London and much of the southern part of England, it was blowing a gale and pouring with rain.

G6HKM caught the 26 September aurora but only worked G10GDP (IO74) as activity seemed very low. By 30 September, tropo conditions had perked up and Ela contacted EI9FH (IO65), EI3GE (IO62), GM0GMD/P (SCD) and GM4BYF (LTH). The morning of 1 October brought QSOs with HB9AOF (JN36), OK1IBL (JO60), Y23KO (JO62), numerous PA and D stations and some Fs and Es.

Next day EA1DDU and EA1BCB and more Fs were worked, while the morning of the 3rd brought a long-awaited QSO with GM4IPK (SLD). In the late evening she had QSOs with SK6AW (JO57) and SK6HD

(JO68). SM7LXV (JO65), SM6NZV (JO65), SM7AED (JO66), LA2PGA (JO48), OZ1HNM (JO57) and OZ1ANA (JO55) were contacted on the 4th. Conditions were up again on the 16th when Ela worked DL00BI (JO52) and DG5OAF (JO51) for best DX.

Ian Harwood, G8LHT (YSS), had 17 contacts to D, F, G and PA in the 26 September aurora between 1726 and 1809. The late-evening phase, 2251-2330, brought QSOs with GM6OFO (TYS), G17CNO and SM7FMX (JO65), among others. (Not sure about GM4IPD, Ian; not in the Call Book.) In the 30/9 to 4/10 tropo opening, new squares in EI, F and SM were worked. Although the OY6VHF beacon was strong at times, no OY activity was heard.

GD6ICR worked seven new countries in the lift - D, EA, F, LA, ON, OY and PA. He would like to join in any "decent auroral warning net." Can anyone help? He is contemplating "setting up a moonbounce station to put GD on the map..." so would appreciate any advice and assistance.

GJ4ICD copied OY6VHF at 1800 on 3 October; it was S3. Next morning Geoff worked SMs and OZs in JO45, 55, 65 and 66. John Hilton, GM1ZVJ (LTH) worked G14KSO (DWN) and G14UUC (ATM) on 30 September, but the real prize was OY6FRA (IP62OA) at 2030 on 2 October.

Mervyn Rodgers, GM0GDL (CTR) also enjoyed the tropo lift and on 30 September worked EI4DQ (IO51), G1BIW (ARM), EI6ARB/P (IO63), GW8ELR (DFD) and EI3GE. Next day brought a partial QSO with an EA1, a complete contact with G0GAW (IO70), and on 2 October, F6APE (IN97), G8ZDS (CNL) and FD1GYA/P (JN15) were worked. Spanish QSOs were completed on the 3rd with EA1s ACD, DKV and QJ (IN53) and EA1BCB (IN63).

With Lawrence, GM0LWD, and Tom Astbury, GM0GMD, Mervyn operated -/P from the Kilsyth Hills (IO76XA) on 30 September between 1835 and 2044. 86 QSOs were made with 21 squares in D, EI, F, G, GW, ON and PA, best DX being DF9QX (JO42HD). GM0GMD took over till 2240 completing 62 QSOs in 23 squares. Tom's best DX was F1HRY (JN18). They were unimpressed with the manners of some operators in the north of England, who kept calling them during QSOs and also ignored their requests for calls from specific areas.

430MHz

Paul Brockett, G1LSB (LCN), reckons this October's tropo conditions to have been below the usual average. On 30 September he

worked GM0GMD/P, on 1 October EI9BG (IO52), GD6DQO/P and EI5FK (IO51) and on the 4th OZ1IWE (JO46) and SK6AB (JO57). He leads the 430MHz section of the table with 141 squares worked.

G6HKM worked G10GDP (IO74) and GM0GDL/P on 30 September, and in the early hours of 1 October, GM4LBV (SCD). Later that day, Ela had QSOs with F6HYE (JN36), GD6DQO/P and EI5FK. The evening of the 3rd brought SK6AB and SM6CEN (JO57). There were fewer participants than last year in the first leg of the Cumulatives on the 13th during which GJ4TAW was worked. HB9MIN/P was contacted in the late evening of the 16th.

Karl Lamford, G6ODT (NHM), using one watt to a 23-element Cue Dee Yagi, worked GW3KJW (GDD), GD6DQO/P, DLOUD, PA0FRE (JO21) and F1DED (JN18) on 30 September. On 3 October he contacted HB9AGE (JN37), F1FHI (IN97) and ON1BLV (JO10).

G8LHT lists HB9AMH/P on 2 October. F6CGJ (IN78) the same day, and SM7SCJ (JO65) on the 4th were new squares for Ian. The lift gave GD6ICR F and PA contacts for two all-time new countries, and GM4IPK for a first Shetland QSO. Alan Stark, GM0BUE (SCD), operated -/P from IO76WA on 3 October and, using FM on 433.50MHz, contacted F1FHI and F6APE (IN97). Next day he worked EA1TA (IN53) using a TE-4000A and 23-element Tonna Yagi.

GM0GDL operated -/P from IO76XA on 30 September, using an IC-402, small amplifier and 5-element Yagi, which brought Mervyn 16 Gs in eight squares between 1847 and 2038. Best DX was PA0WWM (JO22FE). Then GM0GMD took over till 2215, Tom making 19 QSOs with G, ON and PA stations in six squares, his best DX being G4PIQ (SFK).

1.3GHz

In spite of the lift, very little activity has been reported. G6HKM contacted G8MIW (NOT) on 30 September and GM4LBV (IO75) for the first GM this year and an all-time new square on 1 October. Ela also worked G4EQD (HBS). The only one to mention the contest on 8 October was G8LHT who was pleased to work G1GEY (TWR).

By Christmas, G8AYZ hopes to have 20W on the band with increased antenna gain. He thinks there are only three other GIs active on the band, all in IO74 - 0GDP, 4OPH and 6ECV; Ian is available for skeds at any reasonable time. GD6ICR is also looking for contacts and can be QRV at 20 minutes notice.

DEADLINES

I am writing this in the letter part of October for the December issue - so with Christmas looming, it is time for a spot of 'date-juggling'! I hope you learned of the revised January deadline date through GB2RS in time. The copy deadline for February is 22 December, but I'd appreciate your not leaving it to the last minute. The March copy should reach me by 19 January. Meantime, a Very Happy Christmas to all readers and contributors.

SWL

BOB TREACHER BRS32525

Well, you certainly don't need me to tell you that HF conditions changed dramatically for the better early in October. At the time of writing the HF bands were crammed full of DX, and it was difficult to know which band to stay tuned to! If listening to hordes of West Coast Americans was what you wanted to do, the 28MHz band was the place to be. However, 14MHz was producing more exotic DX from the Far East; as a matter of fact, conditions to Japan were exceptional on 28 and 21MHz in the morning, and many Japanese stations were also coming through on 14MHz during the evening hours. With so many strong W and JA stations about, it was easy to miss some real DX buried four layers down in the QRM!

The upsurge in conditions on 28MHz has been very marked. The band was almost devoid of signals on the weekend before the RSGB 21/28MHz SSB contest, but come the contest and the band was full of stations from about 0700 right through until after the event ended at 1900. I logged 67 multipliers on 28MHz, including VK, ZL, FK0, HL, JA and KH2 from the Far East and Pacific. However, activity from Africa was poor and I only heard 3X1, 5N, CN8, 9J2, Z2 and EA8. There were many JAs on the band in the morning, and USA stations in all call areas from 1 to 0 were audible from lunchtime.

28MHz

Since there's so much to report, I've compiled a band-by-band summary of the DX reported by listeners. Let's start with 28MHz, where Robert Small, BRS8841, noted BY5TS, J28TY, HL9EP, YS10D, TG0FRACAP (yes, really) TT8GA, 3DA0AU and JX7DFA. Robert also heard a GD on the band - his first one on 28MHz, believe it or not. Also new was XX9SW.

Robert Watters, BRS90281, provided a lengthy and welcome

report; he doesn't send in many but felt that with conditions so good, he had to put pen to paper. Robert has been an SWL for five years and uses a Yaesu 7700 and long wire. 6 October was a particularly good day for him since not only did he log large numbers of JAs on 28MHz but also found VK9NS and KH0AC.

Colin Watson, BRS46598, found conditions so good that he spent much of his time on 29MHz FM. He logged JAs, Ws and VEs and also copied 5B4, 4X4, SV and ZB2 for new countries on that mode.

Outside the contest, there was a good deal of interesting things heard at this QTH. Amongst them were FJ/DL7FT (St Barthelmy Is), K7SS/PTI (a group of W7s at the Puyallap Indian Reservation near Tacoma, Washington; it seems that DXCC status has been applied for...) and T1100D (via T14SU).

Lastly on 28MHz, David Whitaker monitored the band after sunset and logged some useful DX. From 1800 onwards David mentioned HL5BDS (South Shetland Is), KG4DD, LU1ZA (South Orkney Is), WH6CDY, V44KI, J6LQC, CO5GV, ZD8PJ, 5T5SR and HR1KAS. Moving to 21MHz, David found ZS8MI (Marion Is), 3B9FR, KN0E/KH3, A61AC, FR9A, FK8FA and 3D2AG. Robert Small also had a good time on 21MHz, logging A35KB, 4D9HAM, JT0DX, 9V1XR, N6IV/KL7 (Douglas Is) and 3G6MBQ (Chile). New ones on the band were ZY0FA and OH4ML/H44. Robert Watters reported XE1XRC, J88AQ (via W2MIG), ZF1HJ and KL7GY.

14MHz

The 14MHz band appeared to be open 24 hours a day. I had an enormous number of reports of DX on this band so I've contented myself with pulling out the best which were on offer: KH6HII, BZ4CH, VP2V/KG6WI, S89DX, AH9AC, XX9KA, TJ1RP, SM0OIG/YN, UL1K/UA9SAW (Oblast 024) and 9K2EC.

LF BANDS

Not too much to report on the LF bands, although there were some signs that these were improving

too. David Whitaker provided the most comprehensive report, noting his best as BZ4RDX, VU2RX, A92BE, 9M8PV, HL11UA, YC0DB (1743) and 5T5FA. All these were logged between 1743 and 2156. Albert Tideswell, BRS48462, provided the best log for 3.5MHz. He had obviously been monitoring the band both at sunrise and during the evening hours and found V31BB, LU7DID, ZL1CCR, VK6LK, many JAs, PJ9EE, N6L and XE1ND.

WARC BANDS

A few listeners mentioned the WARC bands, so here's a brief look at what has been stirring there. 18MHz was much the most interesting, and both Robert Small and David Whitaker provided logs. Robert added several new DX countries, together with quite a few in Europe; he said that some of the signals out of W6 and W7 were just as strong as those on 21 or 28MHz, and a few VKs were heard in the evening at 5 and 9. David logged J37AJ, CX9DK, LX1PD (for country no.100 on the band), VP2V/N4VHD, 9M2DW, J73MH/FG and TZ6VV.

Both reporters had a look at 24MHz but there did not seem to be much activity. Apart from some W and ZL stations, the best DX seems to have been KH6SB and HZ1AB (via K8PYD).

VHF NEWS

One could summarize the VHF scene by saying that the bands have been pretty flat. However, at the time of writing it looked as though conditions on 50MHz were about to improve (*they did - GJ4ICD worked 23 VK stations on 50MHz on 12 October - Ed*). It seems that stations in the Far East have been worked from the Near East, and some signals from the USA have been heard in the UK. More on this next month; incidentally, the promised 'montage' of QSL cards will have to keep for a month.

The only real opening of any note was some 144MHz tropo between 30 September and 4 October; this appears to have favoured certain parts of the country considerably more than others. David Whitaker

found GMs and EIs on the 30th and was pleased to welcome EI4DQ (IO51) into the log on 1 October for a new square. There were some EAs on the 2nd, and the 3rd produced some ducting to Scandinavia; David logged SM6DWF (JO57), SM6MNS (JO67), OZ1BUR (JO46) and LA6HL (JO28). The best conditions were reserved for the 4th, when David heard LA4YGA (JO48), SM7AED (JO66), SM7DTT (JO65), Y21NB (JO53), Y23RA (JO64), OZ6OL (JO65) and OZ1HDF (JO55). A brief look at 430MHz with the 144MHz beam produced OZ7LX and SM7FMX! Overall, the opening netted 61 squares in 18 countries for David.

HF NEWS

Listeners might like to know of some interesting DX which should be on the bands during December. The redoubtable OH4ML - of whom I am sure you will have heard previously - is on a trip through the Pacific and should be in 3D2 until 6 December. He's then expected to activate the Maldives before the end of the year - look for 8Q7BX on CW only. For WPX-chasers, it seems that HK9 may be operational this month or in January 1990.

Jim Smith appears to be all set for T31 early in 1990, whilst Chatham Is should be active again in January by courtesy of ZM7VS. Ethiopia is now quite rare, but a well-known Dutch operator is exploring the possibility of a trip there. Nothing is definite, but the authorities are said to be aware of the desire for an amateur radio operation and will make a decision next March or April - watch this space. I mentioned FT5XA last month; seems he's about to have company, since FT5XH and FT4XI were scheduled to have commenced operations from Kerguelen by the time you read this.

Rumours surround a proposed trip to South Sandwich early in 1990 by a group of American operators - that would be a nice one, which I for one need on several bands. Lastly, SM7PKK continues his Pacific trip in December and January. He should be on from 3D2 (Rotuma Is) from 16 December to 6 January, T2 from 10-23 January and T30 from 25 January to early February. Let's hope that band conditions remain good and that listeners will have some nice opportunities to log some of this rare DX.

A final reminder that mail for this part of the SWL column should reach your scribe at the address quoted at the front of the magazine by Friday 22 December.

HF TABLE

Station	DXCC	28	21	14	7	3.5	1.8
BRS25429	263	200	220	226	166	113	35
BRS8841	257	198	211	214	143	110	47
BRS52543	211	124	133	156	128	100	33
BRS1066	166	85	107	122	90	37	38
BRS32525	179	152	82	107	44	24	27
BRS20249	132	56	72	87	32	24	7
BRS91244	59	24	17	35	12	9	0

The number of entries is still very poor, but I do hope that some new ones will be received and that those listeners with entries in the table will update them before the end of the year.

An Automatic Gain Compression Meter

In these days of increasingly crowded bands, it is essential to avoid overdriving our transmitters. Paul Brooking, G4SHH, provides an elegant solution with this home-brew project.

To obtain the most pleasure from our hobby of amateur radio, it is important that we do not cause any avoidable interference to fellow band users. A common cause of interference is a 'wide' SSB signal, usually from an overdriven final amplifier. As has frequently been explained in *RadCom* and elsewhere, an amplifier which is driven beyond its linear range and into gain compression will generate intermodulation products around the main signal. A grossly overdriven amplifier will generate high-order intermodulation products which appear across a large portion of the band as 'splatter'.

The meter described in this article offers a direct readout of gain compression in a linear amplifier when it is amplifying a modulated signal. This is very useful when making adjustments to obtain the highest possible undistorted output power, and also gives peace of mind during routine operation. The meter functions from 1.8MHz band up to at least 144MHz. The prototype was built following good VHF/UHF construction practice, and worked perfectly well up to 432MHz. Although the sensitivity at 432MHz was about 6dB lower than at HF, this does not affect the calibration.

CIRCUIT OPERATION AND DESCRIPTION

Gain compression in amplifiers, and its measurement using power meters at the input and output

of the amplifier under test, have already been covered in *RadCom* and elsewhere [1-3]. The meter to be described just automates the same measurement process.

Referring to **Figure 1**, above the dotted line are shown the amplifier under test, the input and output couplers, the drive source and the load. These are much as described in reference [1]. Below the dotted line are the constituent parts of the gain compression meter. The samples of RF from the input and output of the amplifier are passed through identical gain-controlled amplifiers and detectors. The amplifier gains are controlled by systems in the meter, and the input samples need only be set to give approximately the correct levels. The gain-control signals to the two amplifiers are monitored by circuits which drive LEDs to indicate if the signals are too high or too low for correct operation of the meter.

The PEP output from the input monitor detected output (IMDO for short) is held at a constant level by a peak-detecting AGC loop, which has a time constant of several seconds, much longer than the syllabic rate of the modulation. The output monitor AGC (whose operation is described later) has a similarly long time constant, and is used to set the output monitor detected output (OMDO) equal to the IMDO at a point in the modulation cycle approximately 10dB below peak output power. The OMDO is subtracted from the IMDO to

drive the meter display via a peak detector.

The effect of the two AGC loops is to scale the input and output signals from any amplifier, regardless of level or gain, onto one common linearity diagram, as shown in **Figure 2**. When the OMDO is subtracted from the IMDO, the difference signal is proportional to the gain compression percentage at peak power, regardless of the actual input and output power levels or the gain of the amplifier. Gain compression causes a progressively increasing difference between IMDO and OMDO, which reaches a maximum at peak power. This maximum level is detected, held and displayed on the meter.

I have yet to explain how the output monitor AGC voltage is derived. Since the IMDO has its peak value held at a constant level, the point in the modulation cycle at which the drive is, say, 10dB below the peak power may be detected by comparing the IMDO with a suitable DC level. At this -10dB threshold the control line marked 'gate' in **Figure 1** gives a 'go' signal to the output AGC loop, to set the output AGC voltage to a value which gives zero output from the gain compression subtractor. In other words, the meter assumes there is no compression at a drive level 10dB below the peak RF input power to the amplifier, and measures any subsequent compression at higher drive levels.

Having explained the block diagram, I will now

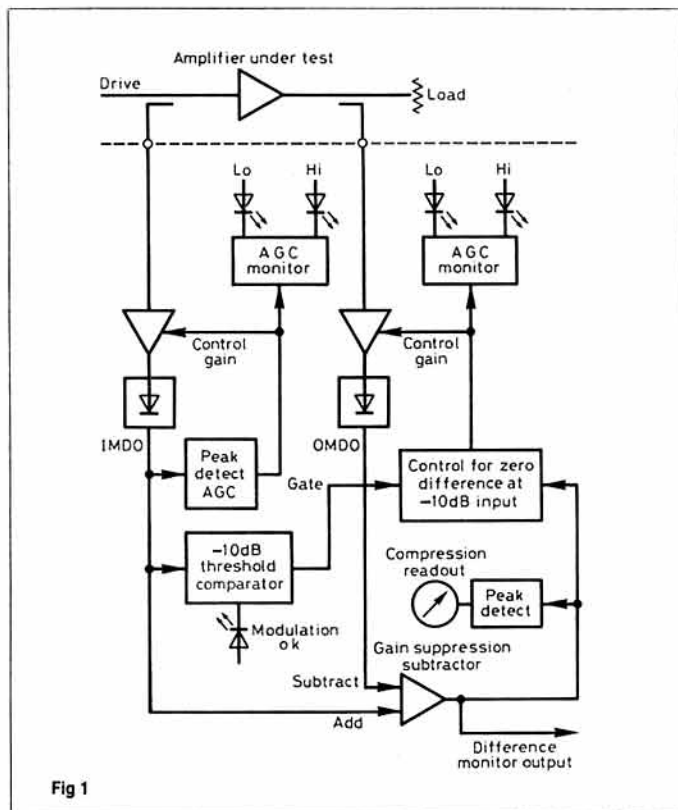


Fig 1

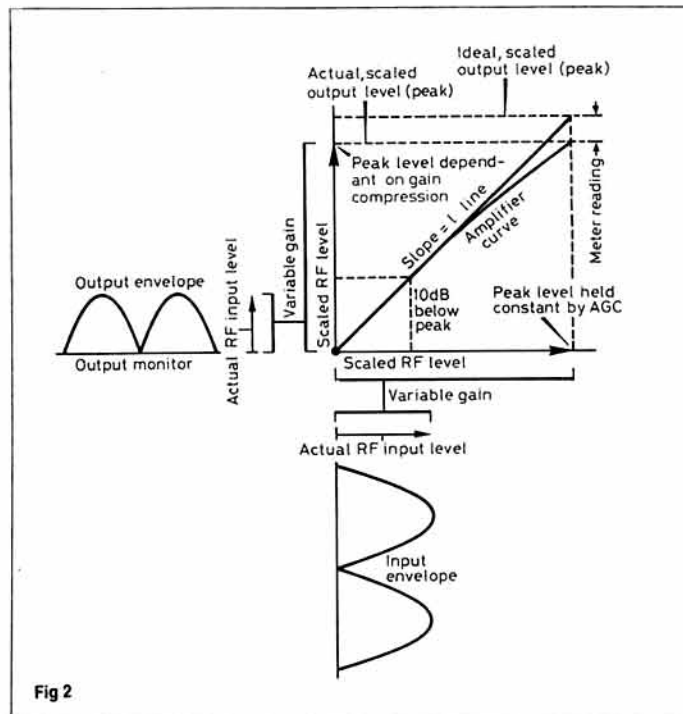


Fig 2

Fig 1. Block diagram of the gain compression meter.

Fig 2. The meter works by scaling the input and output detected RF voltages onto one common linearity diagram, regardless of the actual input and output levels. Gain compression can then be read directly.

describe the circuitry within each block. (Editor's note: Don't worry if you need to go back and read that explanation two or three times - so did we! Clever, isn't it?)

RF MONITORS

Turn to Figure 3. Each RF monitor consists of a 3SK85 variable gain amplifier followed by a BFY90 amplifier and BA481 detector. The circuits are fairly straightforward. A point of interest is that the detector operates with a constant-voltage load (temperature compensated and set by RV3), and the current which the diodes pump into this load is a measure of the RF level. This low-impedance configuration gives a good broadband frequency response. Mild non-linearity in the detectors will not cause significant readout errors, since the non-linearities of the input and output detectors will tend to cancel, provided that the two detectors operate at reasonably similar signal levels. However, linearity in the input amplifiers is very important, so they both need to operate at low signal levels.

IC1a and IC1b convert the detector output currents into voltages (with a +3.0V bias), namely the IMDO and the OMDO. The response speed of these amplifiers is limited by capacitors as filtering against transients generated by the AGC.

GAIN COMPRESSION SUBTRACTOR

IC1c subtracts the OMDO from the IMDO. The bias at the output of this stage is adjustable by the preset RV1, and the gain compression waveform is available at a monitor output for viewing on an oscilloscope if desired.

GAIN COMPRESSION PEAK DETECTOR

IC1d detects the peak level of the (OMDO-IMDO) signal and drives the meter. This stage operates with an input bias of half the 5.6V reference voltage, and the other side of the meter is returned to a resistive divider providing the same half voltage. Sensitivity is adjustable by RV2, and the diodes D33 and D34 across RV2 help to linearise the compression scale.

INPUT AGC GENERATOR

IC2 is a quad open-collector comparator. IC2a produces the required input AGC voltage by discharging the 471F capacitor C37 if the peak level of the IMDO at one input of IC2a exceeds the DC reference voltage at the other input. The capacitor tends to recharge through R49 when IC2a is cut off, leading to a small increase in RF gain. This produces a larger detected signal, which turns IC2a on again and discharges the capacitor. Thus IC2a maintains an AGC voltage which remains essentially constant unless the peak input level changes.

OUTPUT AGC GENERATOR

The output AGC generator is considerably more complex. Resistors R44 and R47 set a DC reference level which is equal to the output of the IMDO at about 10dB below maximum drive power, and this voltage is fed to the inputs of IC2d and IC2b. The circuit associated with IC2d provides an LED indication that the depth of modulation is greater than the -10dB threshold, while IC2b provides a signal to IC2c which is equal to half the 5.6V reference voltage - but only when the IMDO is above the -10dB threshold. For IMDO voltages below this threshold, signal to IC2c is slightly below half the reference voltage and thus the comparator function is disabled. Hence this signal is called 'gate' in Figure 1.

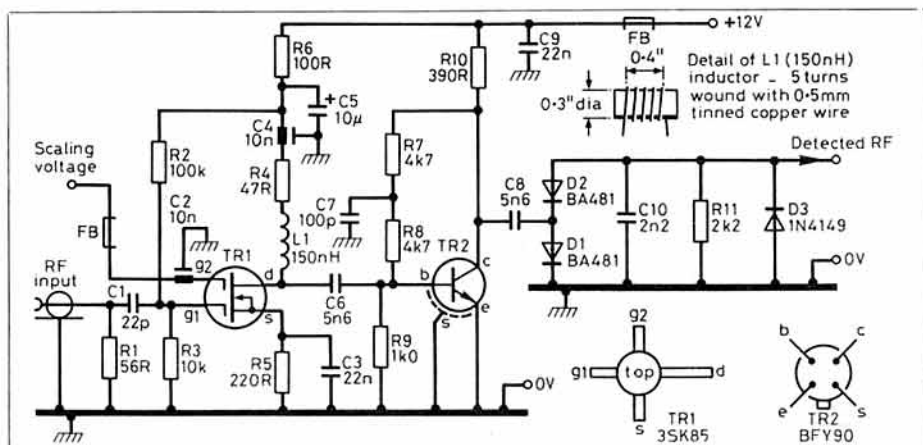
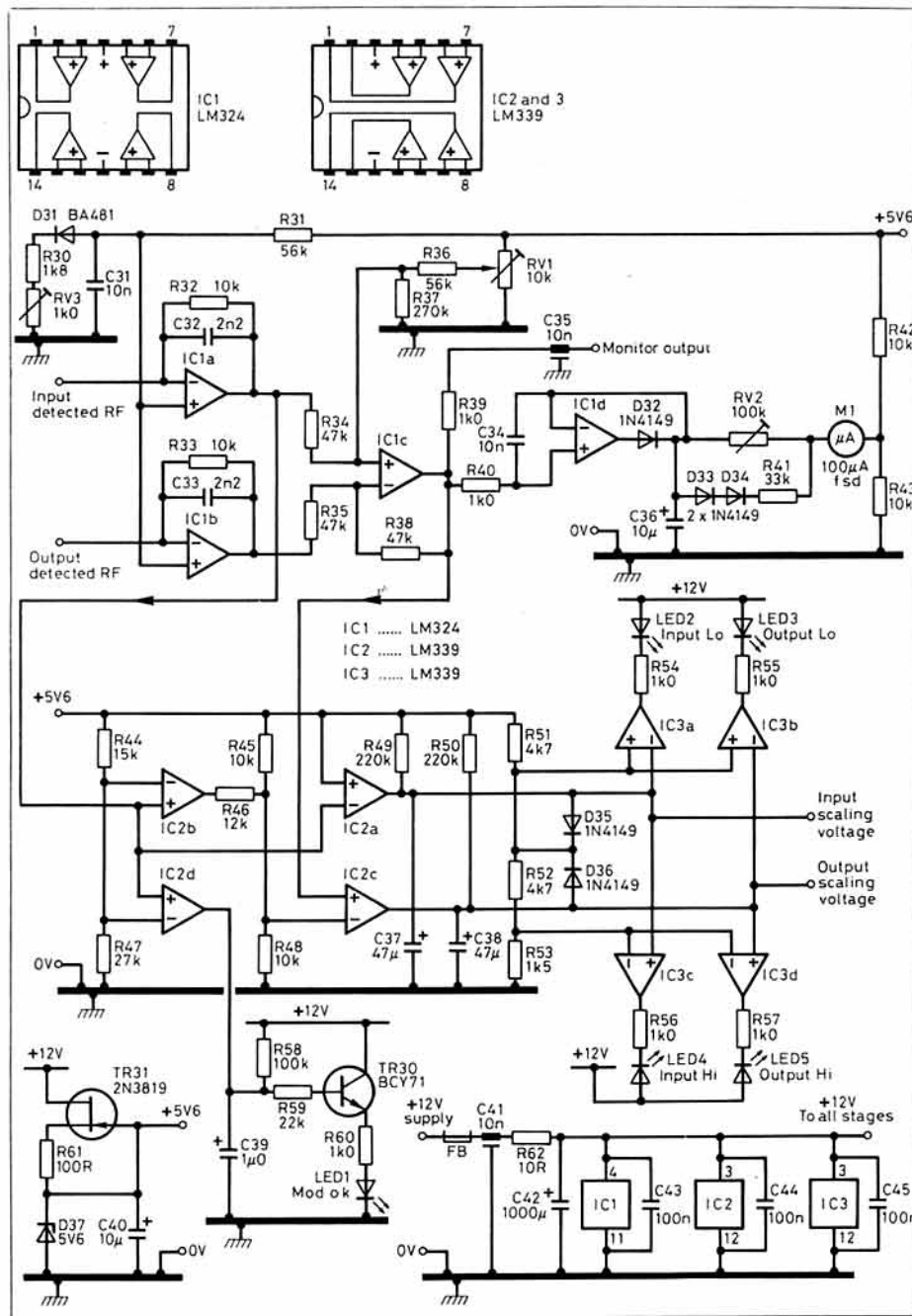


Fig 3. Circuit diagram of the RF monitor amplifiers (Two required) and the remainder of the meter.



The detailed operation of the output AGC generator is best understood by considering what happens as the modulation envelope rises past the -10dB threshold (assuming that the AGC loop has stabilized). As the threshold is approached, the gain subtractor output will be closely equal to half the 5.6V reference voltage, and IC2c will be cut off because the 'gate' signal is low. C38 at the output of IC2c will have been gradually charging through R50 during the previous modulation cycle. Immediately above the threshold, IC2c will discharge the capacitor until the output of IC1c is just equal to half the reference voltage. As gain compression starts to set in and IC1c output begins to rise, IC2c will flip back to the cut-off state. Hence the output AGC voltage will remain very close to the level which was set when the modulation waveform crossed the -10dB threshold.

AGC MONITORING

The maximum voltage to which C37 and C38 on the input and output AGC lines may charge is limited by the diodes D35 and D36, which are connected to a bleeder network between the voltage reference rail and ground. Comparators IC3a to IC3d compare the AGC voltages with taps on the bleeder network to confirm that the AGC levels are within acceptable limits, and that the RF levels are OK.

CONSTRUCTION

Suitable construction is essential for correct operation, though if built as described the meter should work first time without great effort.

The instrument must be enclosed in a fully screened metal box. RF inputs must pass through bulkhead coaxial connectors mounted on the box, and all external low frequency connections must be through feedthrough capacitors with ferrite beads on both sides. A screening plate behind the meter movement was not found necessary.

The two RF amplifiers should be mounted on a ground plane of copper-clad PCB, and built using the shortest possible leads. Figure 4 shows one method of construction. The components are mounted through holes drilled in a piece of single-sided PC board, with all the components except TR1 on the copper side and direct point-to-point wiring on the rear as shown. Leads marked with an X in Fig 4 are soldered directly to the copper ground plane, and all the holes are countersunk to avoid short-circuits. Provided the components are kept close to the board, and the two separate amplifiers are kept at least two inches apart, no internal screening will be required. The low frequency op-amp circuits may be built on Vero-board.

COUPLERS

The meter requires input levels of -10dBm $\pm$ 10dB on both inputs, ie nominally 0.1mW but the AGC will cope with anything between 0.01mW and 1mW. To use the meter with a linear amplifier, some kind of RF sampling coupler is required at both input and output. Figure 5 shows some suitable methods of achieving this. Figure 5a shows a low power resistive coupler, with a maximum coupling factor of -26dB. This coupler is not very broadband, but can be adjusted as desired for any band.

If the input VSWR of the power amplifier is liable to alter with drive level, a more reliable indication of linearity may be obtained by using a directional input coupler which does not respond to the

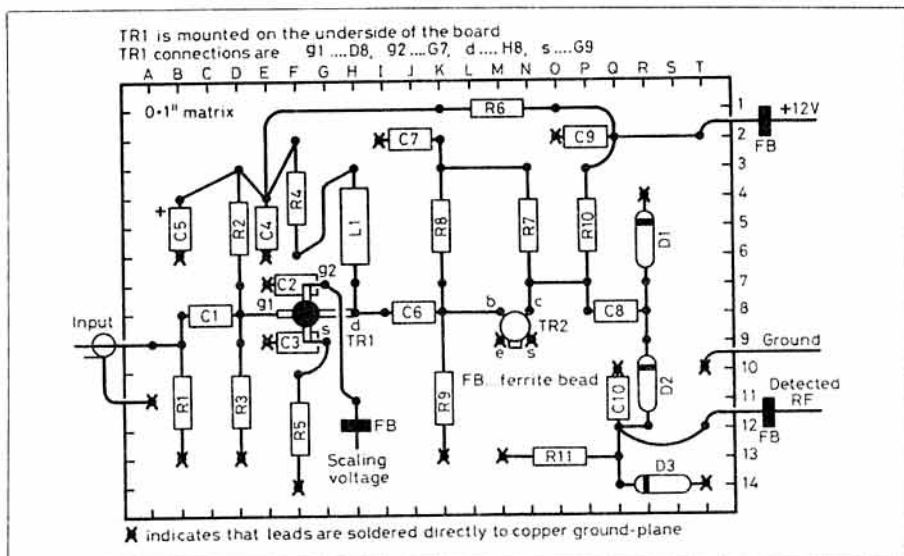


Fig 4. Layout for the input and output monitors.

signal reflected back towards the driver stage. Figure 5b shows such a coupler, which closely resembles a popular type of VSWR bridge, and has a coupling factor of -14dB. The toroidal transformer is wound on a Fair-Rite 26-43000101 core (Circuit), which limits the through power level to about 7W CW or 15W PEP SSB. The one-turn primary is a wire passing straight through the

core, and the secondary is 10 turns. For wideband performance, all components must be mounted above a ground plane with leads not longer than 4mm. The three BNC flange-type connectors must be bolted directly to the ground plane with no extra leads or tags.

The coupler on the output side must be suitable for carrying high power, but need not necessarily be a directional type. Figure 5c shows a simple -60dB coupler made from a piece of UR67 cable. A short length of the outer braid is replaced by a thin copper coupling sleeve, which acts as a capacitive voltage divider between the inner and outer of the coaxial cable. The thickness of the 0.1mm polyethylene outer insulation controls the division ratio. If the coupler is carefully constructed, with no gaps between the layers of copper foil and polyethylene, it will introduce no significant VSWR up to 432MHz. Alternatives to this type of coupler would be a high-power version of Figure 5b with a bigger toroid, or at VHF and UHF a stripline directional coupler. Almost any type of VSWR meter can be adapted for use with the gain compression meter, so long as it is suitable for the frequency and power level in use.

Note that the coupler on the input side of the power amplifier may abstract a noticeable fraction of the input power, causing some reduction in drive, while the high power couplers take only the merest sniff of RF and will cause virtually no power loss.

SETTING UP

If the meter works without any trouble-shooting, no test equipment beyond a multimeter is required to set it up.

1. Set RV2 to maximum resistance and switch on power. Check for correct supply voltages to each transistor and IC, and check for approximately 5.6V on the reference voltage rail. Adjust RV3 for 3.0V at the outputs of IC1a and IC1b; the two voltages should be almost equal.
2. Adjust RV1 to zero M1. The MOD OK and both of the RF LO LEDs should now be on. Short the input AGC line to ground and check that the INPUT LO light goes out and INPUT HI comes on. Repeat the test for the output AGC line.
3. Connect the input monitor line to the low-power sampler, and apply a little RF (CW, any band) to the

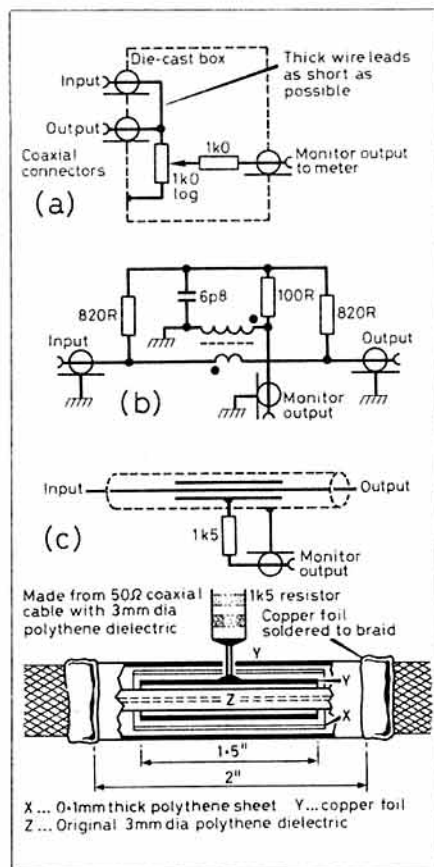


Fig 5. A selection of wideband couplers for power monitoring. 5a Low power resistive coupler. 5b A low power directional coupler. 5c High power -60dB coupler.

extinguish the INPUT LO indicator. Adjust RV2 to give full-scale on M1. The RF level should now be adjustable between the INPUT LO and INPUT HI limits without any significant change in meter indication. The MOD OK indicator should not be on.

4. Connect both the input and output RF monitor lines to the same sampler, and apply CW RF as before. Vary the level and confirm that the input and output LEDs behave the same. M1 should be reading close to zero. If it is not exactly zero then note the reading, switch off the RF and adjust RV1 to give the same reading; now apply the RF again, and use the adjusting screw of M1 to set the reading exactly to zero. Apply RF to the input monitor only, and re-adjust RV2 for full scale deflection.

If the circuit is working correctly, the meter is now set up. This must be confirmed by testing with a modulated carrier or multi-tone SSB signal, but with input and output connected together, ie monitoring the same signal level with no possibility of gain compression. The source of modulation on SSB can be either a two-tone generator or simply a 'waaloh' into the microphone. The MOD OK indicator should come on when the instrument detects a modulated signal, but for inputs between the LO and HI limits the indicated gain compression should be no more than 2% of full scale.

Tests on the prototype showed the following relationship between actual and indicated compression.

Actual compression	Zero	9.5%	18%
Indicated			
10MHz	<1%	8%	16%
30MHz	<1%	8%	16%
70MHz	<1.5%	9%	20%
150MHz	<1.5%	12%	22%
435MHz	<1.5%	13%	24%

Although the meter tends to over-indicate, it is far more important that it continues to read close to zero when the amplifier is behaving in a linear manner. The meter is actually measuring the voltage gain compression percentage, compared with a reference point about 10dB down from the peak drive power. A lower reference point would increase errors due the way the meter operates, while a higher reference might itself fall in the region of gain compression.

USING THE METER

When the meter is used with a linear amplifier, it should become quite clear when the amplifier is being driven into gain compression. You should aim always to keep the meter needle resting at zero; even a little flick upwards may be very noticeable to your fellow-amateurs on the band. For a clean signal, the indicated gain compression should not exceed about 5%, and more than 10% is definitely unacceptable. You may be in for a nasty shock when you see how non-linear your amplifier really is. You may need to turn the drive down a long way to achieve a clean signal - as other people may already have been trying to tell you!

To get the best out of this meter, it is important to realise what the indications mean. The references [1-3] give some preliminary reading if you are not experienced with linearity problems in power amplifiers, and some additional points may be useful here. Intermodulation products are caused by changes in gain (non-linearity) or in the phase of the output signal as the input drive level varies.

Of the two, the gain changes are the more important since any phase change is usually accompanied by a change in gain. Hence this instrument can give useful indications of intermodulation by looking only at changes in gain.

Some tests were carried out on various valve and transistor power amplifiers to explore the relationship between gain compression and the resulting levels of intermodulation products. The levels of close-in third order IPs can be fairly accurately predicted, and are largely independent of the sharpness of the onset of gain compression (also known as saturation). However, the levels of the 5th and higher-order IPs depend very much on how sharply the amplifier saturates; the smoother the passage into saturation, the less poor the higher-order intermodulation performance.

The meter will not measure distortion present in the driving signal, or distortion in the final amplifier that is not accompanied by gain compression (so it won't detect that you left the bias switched to Class C). Any harmonics in either the drive or the output signal will be detected along with the fundamental and will cause errors, so harmonics should be at least 40dB down. For accurate measurements one should consider distortion and harmonics arising from a poor input VSWR to the final amplifier. It is not essential to use a directional coupler to monitor the drive power, but this is a good idea unless you are certain that the input VSWR does not change with drive level; this is frequently the case with transistor power amplifiers and with poorly adjusted Class AB1 valve amplifiers. □

REFERENCES

- [1] In Practice: 'You're still a bit wide, old man' *Radio Communication*, July 1988 p 506.
- [2] *Radio Communication Handbook*, 5th edition. Volume 1, chapter 6; volume 2, chapters 17 and 18.
- [3] *ARRL Handbook*, 1988-, Chapter 25.

COMPONENTS LIST

RESISTORS

R1	56
R2	100k
R3	10k
R4	47
R5	220
R6	100
R7,8	4k7
R9	1k
R10	390
R11	2k2

R30	1k8
R31,36	56k
R32,33,42,43,45,48,58	10k
R34,35,38	47k
R37	270k
R39,40,54,55,56,57,60	1k
R41	33k
R44	15k
R46	12k
R47	27k
R49,50	220k
R51,52	4k7
R53	1k5
R59	22k
R61	100
R62	10 0.5W

All resistors 0.25W, 2% unless otherwise stated.
R1-R11: two resistors required for each.

CAPACITORS

C1	22p
C2	10n
C3,9	22n
C4	10n
C5	10µ tant. bead elect

C6	5n6
C7	100p
C8	5n6
C10	2n2
C31	10n
C32,33	2n2
C34	10n
C36,41	10n feedthru
C36,40	10µ tant. bead elect.
C37,38	47µ tant. bead elect.
C39	1µ tant. bead elect.
C42	1000µ al. elect.
C43,44,45	0.1µ elect.
C1-C10: two capacitors required for each.	

SEMICONDUCTORS

D1,2	BA481
D3	1N4149
D31	BA481
D32,33,34,35,36	1N4149
D37	5.6V 400mW.
(D1-D3: two diodes required for each.)	
TR1	3SK85
TR2	BFY90
TR30	BCY71
TR31	2N3819
(TR1 & TR2: two transistors required for each.)	

IC1	LM324
IC2,3	LM339
LED1,2,3,4,5	Red LED

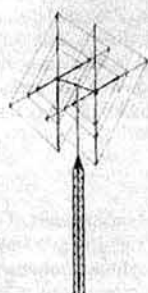
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RV2	100k
RV3	1k
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Kenwood TS140S	£1035.00	£959.00
Kenwood TS680S	£1158.00	£1080.00
Yaesu FT747GX	£918.00	£759.00
Yaesu FT757GX2	£1228.00	£1069.00
Yaesu FT767GX	£1858.00	£1699.00
ICOM IC751A	£1878.00	£1589.00
ICOM IC735	£1357.00	£1069.00
ICOM IC725	£1137.00	£859.00

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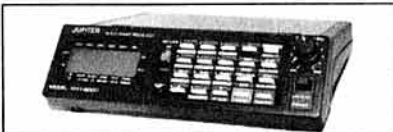
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78F	2m 7/8 wave folding	CA2X4WX	2m/70cm colinear
88F	2m 8/8 wave	CA2X4MAX	2m/70cm colinear, high gain
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358	70cm 3 x 5/8	HS790DN	Duplexer 1/less 1.6-150/410-460MHz
268E	70cm 2 section colinear		

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CHL23J	Small dual band mobile	HDTMCA	S/S trunk mount and cable
CA2X4KG	2m 2 x 5/8 70cm 4 x 5/8	SOMM	Mag mount and cable
70N2DX	2m 6/8 70cm 3 x 5/8	TBR	S/S hatch back mount NEW
HS-727SS	Dual band mini antenna NEW	RS17	Mini hatch back mount NEW
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VM-720SKR	2m 1/2 70cm 2 x 5/8 NEW	SS-B1	Mini h/back mount & cable NEW
		CK-3LX	Cable assembly for RS16, 17, TBR

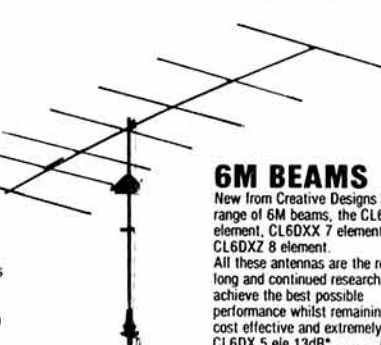
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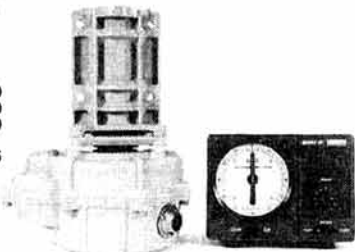
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Funny thing about Kenwood equipment; it always 'feels right,' and this applies to everything they make from the TS-940S to the smallest accessory. Why not call in at your nearest Kenwood APPROVED dealer and ask to see (and hold) a Kenwood handheld. You will not be disappointed.

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TECHNICAL TOPICS

PAT HAWKER G3VA

BATTERIES WITH LESS MERCURY

In 77, March 1985, p192 an item 'Mercury is dangerous' drew attention to the fears in Japan of the possibility of mercuric poisoning resulting from the disposal of the many millions of alkaline-manganese batteries each year containing a significant amount of mercury: "Japan now manufactures some 3000-million dry batteries a year, the majority finishing up on municipal rubbish dumps and landfills... some part of this mercury becomes converted into organic mercury by the action of bacteria and leached away (for example into water supplies)."

As a result I received a reassuring letter from Peter Poole, G3ENV, electrical adviser in the DTI's consumer safety unit (see 77, June 1985, p450). This included a number of safety hints including the need to keep the small mercury 'button cells' away from infants who could swallow them in the belief they were sweets, but took issue with the suggestion that alkaline-manganese batteries contained a potentially harmful amount of mercury. He considered the amount of mercury so small as to be insignificant.

Who was I to argue with the DTI's safety unit? It seemed possible that in Japan (where there had been serious outbreaks of the fatal Minamata disease in 1956 and 1964 caused by factory effluent getting into the food chain) they had become over-sensitive on this issue.

But — surprise, surprise — an item in *New Scientist* (7 October, 1989) states: "Duracell is reducing the amount of mercury in its new alkaline batteries to 0.02% by weight. Two years ago the amount was 5% (that's what it says, though I suspect a decimal point or two may have gone missing — G3VA). Duracell says it plans to

remove all mercury from its batteries... Manufacturers of zinc-carbon Leclanché cells have succeeded in removing mercury from their cells. Until the world became conscious of the risk of mercury pollution, battery manufacturers used a large dose of mercury to prevent 'gassing' — the formation of bubbles of hydrogen gas on the metal electrode."

The report makes it clear that it was a warning by the Swiss government that burning discarded cells with household rubbish releases mercury into the air that has led to the current efforts to reduce the amount of mercury. Why we should take note of Swiss fears but dismiss those from Japan seems puzzling.

CONCERNING 13.8V POWER UNITS

Bert Humphreys, G13EVU wades in to add a few pertinent comments to the recent debate about power supplies for solid-state transceivers. In particular he draws attention to the article by E J Hatch, G3ISD '13.8V power units — an amateur's approach' (*RadCom*, July 1983, pp590-595) which he feels ought to be required reading for anyone contemplating the construction of a mains-operated PSU. G3ISD stressed that while it might seem he was making rather a song and dance about a fairly straightforward piece of equipment, his article should show that there is more to a PSU than meets the eye, and should assist readers in

making use of whatever is available.

G13EVU however adds a rider: "From bitter experience, however, I disagree with G3ISD about the amount of gain which is desirable in the voltage-control loop. Having had several 723 regulators die on me, although ostensibly working well within the outline ratings available to me at the time I constructed the PSU, I later obtained detailed data-sheets which disclosed that the devices were being asked to provide too much output power! This stemmed from a misconception about the Hfe of the single 2N3055 transistor which drives the paralleled output pass transistors. When working near the maximum current of 20A or thereabouts from the PSU, the current gain of these devices falls far below the optimistic figure which the outline data might lead one to expect (this point has been noted before in TT-G3VA); so the poor old 723 was literally working itself to death."

"At the time these problems were arising, I had the opportunity of dissecting several commercially-built PSUs which had been designed for continuous

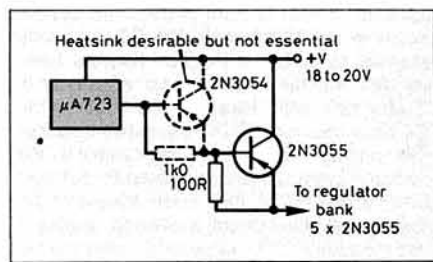


Fig 1. Adding a 2N3054 transistor in the darlington configuration to reduce the need for a 723 regulator to provide a high-current output that can shorten its life.

AN EARLY TRANSMITTING LOOP

Gerald Stacey, G3MCK was not taken by the idea of Richard Silberstein, W0YBF of putting a secret antenna under the floorboards (*RadCom*, September 1989) and my own concern at the idea was that no mention was made of the possible radiation hazard to anyone in the room immediately above (or below) the antenna. On the other hand the compact transmitting loop of high-conductivity copper tubing, out-of-doors if QRO, is establishing itself as an effective antenna for those with restricted sites.

G3MCK continues to find much of interest in the back copies of amateur journals, often unearthing items which attracted little attention when originally published. In this process he has come across an article 'Ham-band transmitting loops' by Richard Hay, W4LW (*QST*, September 1952, pp14, 118) that pre-dates by 15 years the US Army Loop of 1967 to which most recent loop ideas can be traced back. G3MCK writes: "This loop antenna appears to have the dimensions of a modern 'magnetic loop' but is not fed like one nor used in the vertical plane. However it seems certain to radiate better than something under the floorboards! At the worst it supports the theory that anything fed with RF will radiate!"

W4LW's horizontal square loop suitable for balcony mounting had 3ft sides and was connected directly in series with a conventional tank circuit (Fig 3). He reported that it gave him 7MHz CW contacts up to 2500 miles when fed with 40Watts

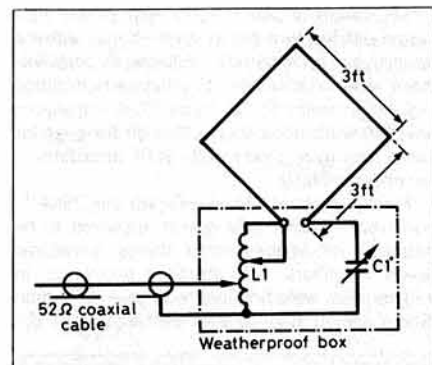


Fig 3. The 1952 horizontal-plane 'transmitting loop' of W4LW was simply connected in series with a conventionally tuned circuit. For a loop with 3ft sides at 7MHz, L1 had an inductance of 2.5μH and C1 a maximum capacitance of about 150pF (high-voltage spacing).

of RF, with 'reliable' contacts up to 1000 miles. He wrote: "The possibilities of this system have not been explored fully. However, two facts have been established: it works, and it is a wonderful subject for conversation during QSOs!"

W4LW's loop used No 12 wire for both the loop and for L1 but he pointed out "an improvement could probably be effected by the use of heavier wire or even copper tubing." In 1952, SWR meters were still uncommon and he described an adjustment technique that did not depend on their use. He wrote: Adjustment is as follows: (a) Substitute

a 52-ohm dummy load for the antenna system and adjust transmitter for proper loading. (b) Remove dummy load and replace the loop antenna assembly. (c) Set the tap for the coax connection at about 3 turns and tune C1 to resonance at the transmitter frequency. (If necessary, reduce inductance of L1 by shorting turns with the second tap.). (d) Vary the position of the coax tap (retuning C1 each time) until proper loading is indicated. The position of the coax tap is a fairly critical adjustment and must be set to the nearest 1/4-turn for best results. An SWR indicator would be very helpful, although it can be done by 'cut and try'... It would be desirable to make the loop as large as possible, with corresponding reduction in L1. The ultimate would be to reduce L1 to just enough inductance to match the coax line impedance; the larger the loop, the greater the (desirable) radiation resistance and the wider the band of frequencies that can be covered without re-adjusting." The square loop with 2-ft sides had a bandwidth on 7MHz of about 20kHz. W4LW reported "An unexpected by-product of this system is freedom from TVI and, on reception, marked reduction in local QRN with interference from the line output oscillator of a neighbour's TV set disappearing entirely."

The inclusion of the loop within the lumped inductance tuned circuit must inevitably increase the resistive losses compared with the present use of a small inductively coupled matching loop. However, there are circumstances in which W4LW's horizontal loop might be a useful, if makeshift, arrangement.

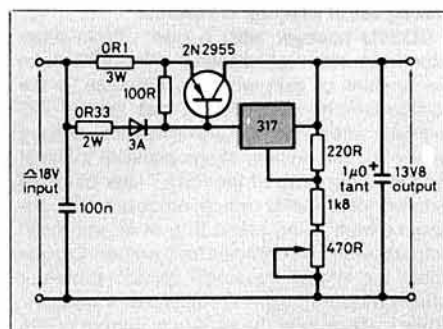


Fig 2. G3EUV's 'beefier' constant-voltage charger arrangement for car batteries. Provided the charger is set to 13.8V it can be left permanently charging the battery.

high-current service, and found that none of them required more than a whiff of current from the 723. So I connected a 2N3054 in darlington configuration between the 723 and the 2N3055 (see Fig 1) whereupon my problems disappeared.

"Subject to the reservation mentioned about loop gain, it must be hard to better the control circuits of the 'Marchwood' 30A PSU originally described by G4JET in *Practical Wireless* June-July 1983, with the circuit diagram reproduced in *TT*, May 1984, p402. However, when built on the PCB obtainable from *PW* I have found it susceptible to RF pick-up. Although this was curable by the addition of bypass capacitors attached to strategic points on the board, they made a mess of the otherwise-attractive layout. A redesign, bearing in mind the amount of RF likely to be present in the average shack, would be welcome (*PW* to note?).

With further reference to the excellent advice given by G3ISD in 1983, I should like to suggest that prospective constructors give more thought to the ratings of the transformer they propose to use. If the component is adequately rated in terms of current (as it should be) an on-load secondary RMS voltage of 16 is quite adequate; anything appreciably higher merely aggravates the problem of heat dissipation. In practice, if the heatsinks become uncomfortably warm to the touch in normal CW operation, it's an odds-on bet that the secondary voltage is excessive!

"Finally, I share the reservation of GM0IJF (*TT*, August 1989, p35) about the use of car batteries. If used with a constant-voltage charger giving a charge of about 1A or thereabouts, the key-down voltage drops unacceptably after a few short overs. A beefier constant-voltage charger, capable

of delivering 5 or 6A at 13.8V is quite simple to construct (see Fig 2) and will keep the voltage to the transmitter at a reasonable value. Since the current from the charger drops virtually to zero when the battery reaches full charge, it can remain permanently in circuit without detriment to itself, the battery, or the transmitter."

50 WATTS RF FROM LOW-COST FET AT 7MHz

To judge from the trend in broadcast transmitters, the use of FET rather than bipolar devices is becoming firmly established, at least up to 250MHz. MOSFET devices are available delivering up to 200 watts RF at VHF, free from such problems as secondary breakdown. But such state-of-the-art devices are far too costly for their use in experimental amateur rigs where there is always the danger of destroying several devices during development. An alternative, for low power, noted in *TT* July 1989, p39, is to use low-cost switching-type FETs which can deliver say, 12.5 watts per device up to 30MHz.

David Bowman, G8PDW has sought out a different low-cost approach that has enabled him to obtain more than 50Watts output at 7MHz from a n-channel FET device costing under £5. He describes his bench work (his Class B licence means that his HF load is a power meter rather than an antenna) as follows:

"I was first made aware of the potential of using audio-frequency MOSFETs for RF power amplification when a friend attempted to build an audio amplifier. His neighbours discovered that while the amplifier provided the appropriate number of watts at AF, it was also generating a significant output across the higher end of the medium-wave broadcast band. Investigation revealed RF signals up to 4MHz.

"So started a search for a high-power FET device with fast turn-on/off times. I began with the devices used in my friend's oscillating AF amplifier: these were Hitachi 2SK135 enhancement-mode n-channel power FETs. These TO-3 transistors have 100-watts dissipation; although designed for audio, they gave good results as RF amplifiers — but only to 10MHz.

"Finally, I choose to investigate the 2SK413, also from Hitachi. This device appeared to be designed for, among other things, ultrasonic power amplifiers. This sounded promising. In addition they were not fitted with gate-protection diodes which had caused problems with the

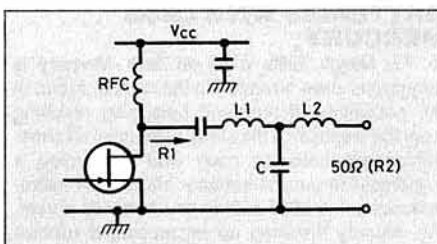


Fig 4. Narrow-band LCL 'T' output network adopted by G8PDW using values calculated from the design procedure set out in ARRL's *Solid-state Design for the Radio Amateur*.

2SK135."

G8PDW set himself the task of designing an RF power amplifier capable of reasonable power out (say 50 watts per device, roughly comparable to the old 807 valve), initially on 7MHz then at higher frequencies. Characteristics and maximum limits for the 2SK413 are: drain — source voltage V_{ds} 140V; Gate — source voltage V_{gs} $\pm 20V$; channel dissipation P_{ch} 100W; rise time 15 nanoseconds; fall time 50nsec.

G8PDW felt that the switching times were fast enough for his purpose but noted that the T03P package would require insulating if a grounded-source circuit was chosen. An input capacitance at 1MHz of 800pF showed that care would be needed in the network design.

G8PDW decided to use a narrow-band output circuit with an LCL 'T' network having a working Q of 12. Using the procedure given in the ARRL's *Solid-state Design for the Radio Amateur*, he obtained the values for the network of Fig 4, for 7.1MHz, 50Watt power and 36V supply line, as: L_1 33.6 μ H, L_2 6.63 μ H and C 222 pF (G8PDW provided in his letter a fully worked example but this has to be omitted in the limited space available for *TT*). The inductors were wound on iron-dust toroids type T-130-6 since the number of turns required can be found from the formula $L(nH) = n^2K$ where n is the number of turns required and K is a constant for the core. A variable capacitor is used to tune to resonance.

G8PDW continues: "Finding a suitable input network proved a real headache. Several types of narrow-band networks were tried without success. Disappointedly, I turned to W1FB's article in *QST* (April 1989, pp30-33). He used broadband transformers loading into part of the bias circuit. The explanation for this approach was that the input impedance of the IRF511 was extremely high and

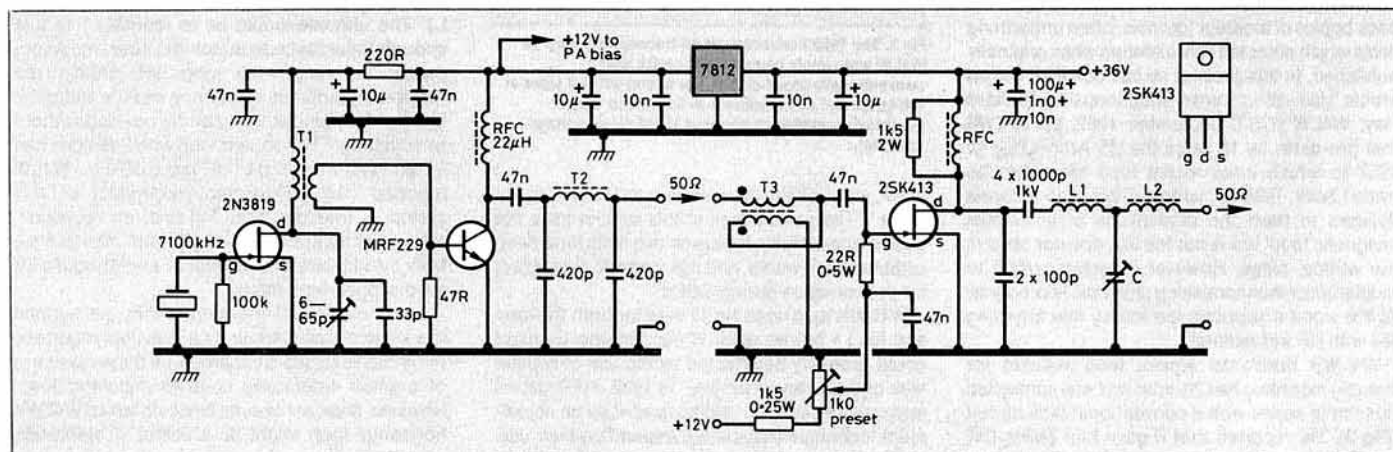


Fig 5. The 7MHz power amplifier and drive unit as designed by G8PDW for the 2SK413 audio-type power FET. For 14MHz the output network values need to be recalculated. Component details are shown under Table 1. Note that the 22-ohm resistor is mounted close to the case on the FET gate lead.

the effective input impedance could be controlled by using a resistor across the gate; both as a load for the incoming RF and as a source of bias. I was doubtful, but desperate!

"W1FB had used a 4:1 step-up transformer with a 200-ohm load as part of the bias circuit. This was reproduced and with 1.5W drive the unit was switched on... The result — nothing: 10:1 SWR and no output. A brief attempt was made at resonating the input capacitance with a parallel inductor. This did work (25W output) but not with unconditional stability and the required inductance values differed with different production batches of FETs. It seemed that was that; if subtle design and pages of calculations failed, perhaps brute force would.

"But W1FB's approach had rung a bell in a long-unused part of my memory: it rang out 'passive grid techniques'. Reverse the 4:1 transformer former to give a 12.5-ohm source and provide a partial load; 22 ohms should do it I thought... and it did, within ten minutes the circuit was up and running and the dummy load warming up nicely.

"As a Class B licensee, I did not have a readily available source of HF drive. So a simple crystal oscillator/amplifier was used. As shown in Fig 5 and Table 1 this approach yielded up to 73 watts output from just three devices. The RFC was constructed from a ferrite ring; normally this should have an XL of about ten times that of the output impedance of the transistors; in this case $12.5 \times 10 = 125$ ohms but not unduly critical. What is really important is that the Q-factor of the RFC is low. To ensure this a 1K5 resistor was wired in parallel; otherwise RF chokes can cause 'ringing' and other unwanted resonances which if ignored may cause the Vds rating of the device to be exceeded.

"I have also adopted W1FB's technique of including a capacitor from drain to ground. After extensive tests with a high frequency oscilloscope, I determined that a capacitor with a reactance of about nine times the output impedance of the amplifier is sufficient to remove any HF energy from the drain circuit without affecting the efficiency of the amplifier.

"The bias has two functions: (a) providing a bias voltage for the FET between 0 and 5V; and (b) providing a load for the incoming RF drive. The 2SK413 has the following bias characteristics: Conduction begins at Vgs +3.15V; Id = 50mA at Vgs +3.77V; and Id = 100mA at Vgs +4.04V. At 100mA, the amplification characteristics began to appear to be linear, the output power varying in direct proportion to power input. The IMD characteristics have not been measured but I would suggest that 100-250mA would be a suitable quiescent current for linear operation.

"At 14MHz results are incomplete but encouraging. Again using the T-network design formulae, the output network values were changed accordingly. The input circuit is inherently broadband and was left unchanged, as was the RFC. The drain by-pass capacitor was halved in value to 100pF according to the criteria given above. Unfortunately my source of RF drive, using a 14.330kHz crystal, was limited to 1W and this proved insufficient to drive the amplifier fully. However, by increasing the bias it proved possible to get 38W output. This represents a gain in excess of 15dB. I feel convinced that if more drive had been available, the results would have been similar to those obtained on 7MHz.

"I feel that the experiments with this low-cost device have been a success. The networks are

CO-AXIAL PLUG LORE

Ian Hamilton, GM3CSM comments on the September 77 item on the method recommended by Aerialite for connecting co-axial cable to their consumer-type plugs. He prefers a slightly different method shown in some 1970s publications: "With this method, the braid is inserted with the centre conductor and insulation *through* the cable grip, teased out over the 'leading' rounded end of the cable grip, and cut off just short of the 'trailing' edge: (Fig 6). When the plug is assembled the braid is firmly clamped by the plug cap between the cable grip, the plug body and the bevelled end of the plug insulation. Most viewers/users seem to pull these plugs out of their sockets by the cable, but I have never been asked to remake any of those I have made up in this way. As you say in 77, soldering the centre conductor to the plug pin should be considered mandatory — but try telling that to the TV trade!"

GM3CSM recalls several occasions when he has been able to improve viewers' reception simply by cleaning and soldering their oxidised plug connections — particularly in seaside or industrial environments. A well-soldered connection is the only long-term protection against a salt-laden or polluted atmosphere.

I once sat on one of the two BSI committees that, over many months, drew up BS6330: 1983 'Reception of sound and television broadcasting'. The committee spent time discussing the problem that trade installation technicians could seldom be persuaded of the need to solder plug connections. In the outcome 5.3.2.2 of BS6330, Installation, item (j) recommends, a shade ambiguously: "Coaxial plugs should be assembled in accordance with the manufacturer's instructions and the inner conductors soldered where applicable. A type

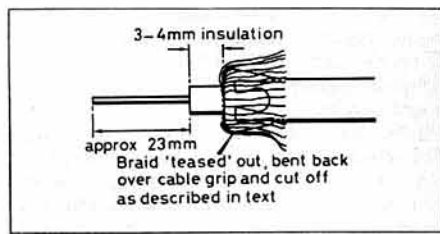


Fig 6. GM3CSM recommends inserting the braid with the centre conductor and insulation through the cable grip when fitting TV-type co-axial plugs. For details see text.

employing a crimped connection should only be used in conjunction with a proper crimping tool."

A 1984 77 item on BS6330 stressed that for any installation, wind forces, corrosion, oxidation and so on tend always to be more severe than one imagines. BS6330 reminds installers that any outdoor system that is erected in a situation where it is exposed to the rigours of the climate will experience wide ranges of temperature (from well below freezing to over 55°C), rain, snow, ice formation and high-velocity winds; it will be subject to metal fatigue, as are all stressed metal structures. The degree of exposure of the site needs to be considered very carefully: coastal sites, sites on hills or on or near very tall buildings need special care. It is worth remembering that most weather data are based on statistical information and are not absolute values. I pointed out then that an assurance that wind gusts are likely to exceed 100mph only, say, once in 20 years means, by Murphy's Law, that gusts will certainly exceed 100mph the following winter. For those in the south of England, Murphy was a couple of years out: the 'hurricane' did not arrive until October 1987!

totally stable and the use of the T-network may possibly allow the amplifier to be used on-air without additional filtering. There are many possible routes for the development of practical HF amplifiers from these humble beginnings. I am currently constructing a pushpull amplifier using a pair of devices which I believe should provide an output comfortably in excess of 120W between 3.5 and 21MHz. There are possibilities of building multiple-device designs along the lines of the Motorola EB104 design with the output power approaching the 400W UK limit. The 2SK413 is currently available from RS Components Ltd at £3.75 + VAT. The toroid cores were available from Bonex Ltd of Langley, Berks.

Frequency	Supply Voltage	CW Output Power	Efficiency
7100kHz	36V DC	52W	73-75%
7100kHz	43V DC	73W	73-75%
14,330kHz	43V DC	38W	—
Drive power input at 7MHz approximately 1.5W			
Drive power input at 14MHz approximately 1W			

Table 1 — Performance of G8PDW's FET Amplifier.

Notes: Output power measured on Marconi absorption power meter, checked with peak-to-peak voltage measurement at dummy load. The efficiency was not measured at 14MHz due to increase in quiescent drain current used to compensate for lack of drive power. Component details (7MHz only) T1 341 of 0.4mm enam with 41 link of 0.56mm enam copper on T-50-2. T2 13 turns of 0.56mm on T-50-2. T3 4:1 broadband transformer. 8 bifilar turns of 0.5mm enam copper twisted 5 turns per inch on ferrite core od 12.4mm μ 125 (Bonex No 530090). L1 18 turns 1.2mm on T-130-6 toroid. L2 23 turns 1.2mm on T-130-6 toroid. C 150pF +

6-100pF variable in parallel. Capacitors rated at 350V. RFC 14 turns 1mm enam copper on 1-in od ferrite toroid.

UP-DATE ON WORKING EARS

In the 77 item 'The Way We Listen' (June 1989), I quoted a 1953 comment by the physiologist Dr Kraus that "Because of its smallness, the ear presents some of the most disputed problems of human physiology... the mechanism of hearing is still a matter of dispute. In spite of its small size and complicated structure, the ear compares roughly with a modern radio receiver... one might hold the view that an accurate examination would immediately expose the purpose and function of each individual constituent part. The opposite is the case and all theories are still full of contradictions."

I doubt if Dr Kraus would express exactly the same puzzlement today. Since 1953 much effort has been put into solving the many mysteries of hearing — and also how our ears provide us with the sense of balance needed to walk on two legs. For most of us, our ears are the final link in amateur radio operation; yet many of us, along with 'the walkman generation,' tend to put our hearing at considerable risk by subjecting them to 'acoustic trauma'.

A long review article 'How the ear's works work' by A. J. Hudspeth (University of Texas South Western Medical Centre, Dallas) in the prestigious scientific journal *Nature* (5 October 1989, pp397-404) shows not only the enormous amount that has been learned about the working of our ears in recent years, but also the exceptional vulnerability

of what is normally a reliable system. It appears that the key to greater understanding came with the recognition of the role of sensory receptors called 'hair cells' which can detect "motions of atomic dimensions and respond more than 100,000 times a second."

Dr Hudspeth introduces his article as follows: "The internal ear is an evolutionary triumph of miniaturization, a three-dimensional inertial-guidance system and an acoustical amplifier and frequency analyser compacted into the volume of a child's marble. That we are ordinarily oblivious to what goes on within the labyrinth reflects the ear's reliable performance: our bipedal stance, our capacity for locomotion on foot and in vehicles and our ability to communicate vocally, all stem from the ear's incessant activity. The internal ear, in turn, owes its success to its complement of hair cells, the epithelial receptors responsible in the cochlea for our sensitivity to sound, in the utricle and saccule for our perception of linear accelerations, and in the three semicircular canals for our appreciation of rotary accelerations..."

"The volume of the human nervous system devoted to the auditory and vestibular systems also testifies to the ear's importance. The 32,000 hair cells of the two cochleae and the total of 134,000 cells found bilaterally in the organs of equilibrium forward their signals to the large cochlear and vestibular nuclear complexes of the brainstem's medulla and pons..."

"The paucity of hair cells also accounts for the exceptional vulnerability of the auditory system... destruction of 166,000 hair cells would entail disequilibrium and profound deafness, both major impairments. Society is awakening only slowly to the cost of acoustic trauma in both industrial and recreational settings; within the next decade or two, the 'walkman generation' will find itself unexpectedly and ardently interested in auditory pathophysiology..."

Much of the language of the *Nature* article is likely to be incomprehensible to those who are not physiologists, but the import is clear: stick an earpiece or pair of earphones running at high output on your ears for many hours a day and you will be exposing them to an unacceptable acoustic trauma: it could make your hair cells curl up and destruct! On the other hand, if the audio peaks are kept low all should be well.

The cocktail party effect is a good example of the astonishing ability of the way our ears can discriminate between phase differences that are measured in microseconds. Dr Hudspeth writes: "The localisation of sound sources, one of the most important roles of hearing, sets even more stringent limits on the speed of transduction. If a sound source lies directly to one side, an emitted sound will reach the nearer ear somewhat sooner than the farther; for a human-being the maximal delay is about 700µsec. Humans and owls can locate sound sources of much smaller temporal delays, less than 20µsec. For this to occur, hair cells must be capable of detecting acoustical waveforms with microsecond-level resolution; even more remarkably, this temporal information must be transmitted along axons whose individually signalling rate is less than 1kHz."

He also notes that the acoustic radar system of bats, with targets such as a 3mm-long insect, requires an auditory response extending to at least 150kHz! Pity the designer of hi-fi equipment for bats. Then, again, he writes: "Although the auditory system is capable of improving its signal-

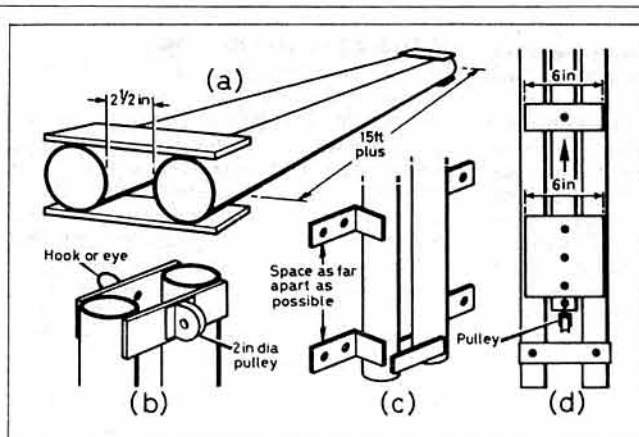


Fig 7. Details of G1JKX's method of constructing an extendable 30-ft mast using scaffold poles and 2-in alloy tube.

D-I-Y EXTENDABLE MAST (LOW-COST)

John West, G1JKX writes: "After a few years trial-and-error in making low-cost masts, I think I have cracked the problem. Two metal scaffold poles, 15ft or more long, are placed side by side, about 2.5-in apart. Two mild steel spacers, about 6-in long, 2-in wide, 1/4-in thick, are welded or bolted at each end of the scaffold poles (Fig 7 a). A 2-in pulley is welded on the top at the back (Fig 7 b). Two wall-brackets are welded on about 2-ft below the highest point of the wall on the poles (Fig 7 c).

Then an alloy-pole (20-ft-plus long) is placed between the two scaffold poles with a 2-in pulley placed on the bottom and bolted in place (Fig 7 d). About 3-ft from the bottom of the alloy pole a stop bar is bolted on, with a slide bar bolted on the bottom. Wire rope is tied to the top of the scaffold pole, down to the bottom of the alloy pole, through the pulley and back up to the pulley at the top on the front, then down to the bottom again. Bolt the mast to the house wall, etc, add rotator and VHF antenna to the top of the alloy section. Pull the alloy tube up to its maximum height by means of the wire rope; tie rope securely to a wall bracket or similar fixing point. Result: a 'cheapie' 30-ft-plus extendable mast." (Fig 8).

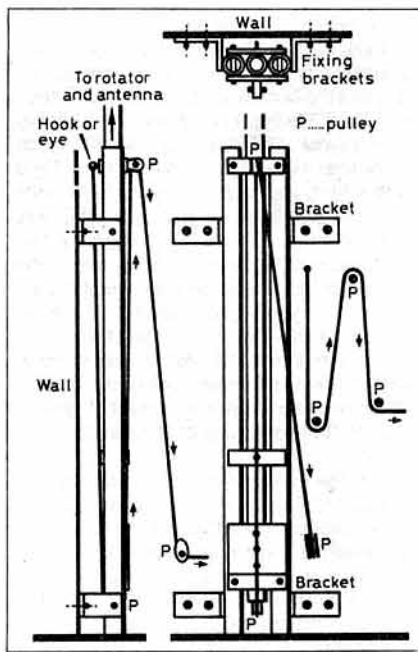


Fig 8. The completed mast.

to-noise ratio to some extent by averaging responses over several cycles, the sensitivity of our hearing is ultimately limited because fainter sounds are drowned out by the thermal clatter of the components of the ear."

The June *TT* item drew attention to the discussion in *Sprat* of the advantages of listening to CW at an AF beat note of about 400Hz rather than about 1000Hz. I suggested that it has been firmly established that the selectivity/discrimination of the ear is higher at low frequencies and that this is borne out by the phenomenon of Zwicker 'masking' as now being used to reduce the bit-rate of digital-audio for transmission purposes.

Angus Taylor, G8PG (Communications Manager of the G-QRP Club) has now brought to my attention the Club's new 8-page 'A report on Project Frequency Band' compiled by G3XJS, GW0DYT and G8PG. This evaluates the use of outboard passive LC filters with centre frequencies of 750Hz and 450Hz for use with direct-conversion receivers. It has been produced at the request of Ed Wetherhold, W3NQN, technical adviser to ARRL on filter design. The three participants compared the usefulness in practice of both filters. In summary, it was found that 450Hz was more useful than 750Hz, although having both

available (switchable) gives additional flexibility. The investigation has thrown up some interesting unanswered questions: the 450Hz filter seemed better from a noise point of view, but is this due to the filter or the better aural discrimination at this frequency or both?

The report does seem to bear out the view that in receiver design we need to take fully into account the characteristics of the human operator, including the way our ears work. G8PG adds: "The use of an AF amplifier at the filter output will allow the attenuation in the filter to be restored easily, common telephony practice ever since the advent of the valve, but usually ignored in amateur radio designs. Provision of such a low gain amplifier allows the filter designer to concentrate on bandwidth and skirt sensitivity without the additional worry of pass-band loss."

"The use of AF oscillators in the 800-1000Hz range for morse practice and testing mitigates against maximum efficiency in aural CW reception; students become conditioned to these higher frequencies and have to be 'deconditioned' if they are to use lower-frequency filters. But once deconditioned, they soon appreciate the effectiveness of low-frequency beat notes and use them a great deal."

BALANCED TO UNBALANCED transformers

Real-life antennas are nothing like the textbook pictures. The textbooks show us a simple dipole, fed in the centre, with electric field lines neatly connecting the opposite halves, and lines of magnetic flux looping around the wires. **Fig 1a** is a typical version of this pretty picture, showing only the electric field lines for clarity. Everything is symmetrical, and the system is said to be 'balanced' with respect to ground.

The reality of a typical installation is very different. As **Fig 1b** shows, the electric field lines connect not only with the opposite half of the dipole, but also with the feedline, the ground, and any other objects nearby. The magnetic field may be less disturbed, but the overall picture is in no way symmetrical! Although the electromagnetic coupling between the opposite halves of a horizontal dipole makes the antenna 'want' to be balanced, the coupling has to compete with the distorting effects of the asymmetrical surroundings. As a result, practical antennas can be very susceptible to the way they are installed, and are hardly ever well-balanced.

Contrast the messy environment of the antenna with the tidy situation inside a coaxial cable (**Fig 2**). The currents on the centre core (I_1) and the inside of the shield (I_2) are equal and opposite, ie 180° out of phase. The two conductors are closely coupled along their entire length, so the equal and antiphase current relationship is strongly enforced. Also, what goes on inside the cable is totally independent of the situation outside. Thanks to the skin effect, which causes HF currents to flow only close to the surfaces of conductors, the inner and outer surfaces of the coaxial shield behave as two entirely independent conductors. You can hang the cable in the air, tape it to a tower or even bury it, yet the voltages and currents inside the cable remain exactly the same. About the only things you can do wrong with coax cable are to let water inside, or bend it so sharply that it kinks. That's why coax is popular - it is so easy to use.

The problems arise when you connect a coaxial

There is much more to the humble balun than first meets the eye. Ian White, G3SEK, explains the ins and outs

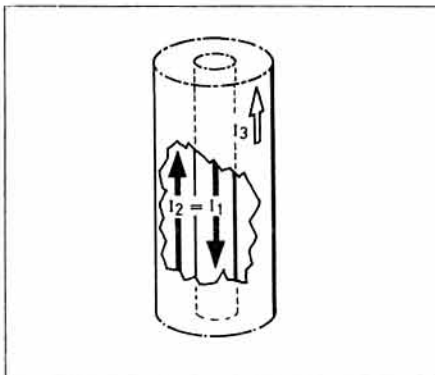


Fig 2. Currents on the inside of a coaxial cable (I_1 and I_2) are always equal and in antiphase. The skin effect allows a separate current I_3 to flow on the outside.

cable to an antenna. If the antenna is in any way unbalanced—which it will be, in any practical situation—a difference will appear between the currents flowing in the antenna at either side of the feedpoint. This difference current is shown in **Fig 3** as I_3 , and is equal to $(I_1 - I_2)$. The current I_3 has to flow somewhere. It cannot flow down the inside of the cable because I_1 and I_2 must be equal; so instead it flows down the outside of the outer sheath. As a result, the feedline becomes part of the radiating antenna. This causes distortion of the radiation pattern, RF currents on metal masts and Yagi booms, and problems with 'RF in the shack'. Even worse can be RF currents flowing in the mains and on TV cables, leading to all manner of EMC problems.

By using an appropriate type of balun at the antenna feedpoint, you can effectively prevent stray surface currents on the feedline. As a result, the current distribution on the antenna will adjust itself to become more symmetrical, so the antenna will work better and many of your EMC problems may also disappear.

BALUNS

The word balun is short for 'balanced to unbalanced'. A balun is a device which somehow connects a balanced load to an unbalanced coaxial line. There are two ways of approaching this task, so there are two distinct types of balun. The **choke balun** aims to prevent I_3 from flowing, by placing a large series impedance on the outside of the feedline. As a result, the antenna currents can only flow on the inside of the feedline, and the properties of the coaxial cable force the antenna currents at either side of the feedpoint to be equal and in antiphase, ie balanced. The **transformer balun** aims to force the voltages and currents at

either side of the feedpoint to be equal and in antiphase. As a result, no difference current I_3 remains to flow down the outside of the feedline.

Antenna balance and feedline surface currents are inter-related, and choke and transformer baluns are merely tackling the same problem from its two opposite ends. Choke off the difference current, and the antenna currents must adjust themselves to become more symmetrical. Alternatively, try to make the antenna currents equal, and the difference current will tend to disappear. Given these opposite approaches to the same problem, you can see how a variety of quite different-looking devices come to be called 'baluns'. And since the same kind of balun can work well in one situation but not in another, it's small wonder that many people find the subject confusing.

Further confusion arises because baluns can be used for different purposes. To give just two examples, a balun can be used to cure TVI by suppressing feedline radiation; or it can be used to force a more symmetrical current distribution upon an antenna which is basically unbalanced with respect to ground (eg a low-mounted vertical dipole). In these two examples you are expecting quite different things from the balun, so you might well choose a different type for either task.

To clarify matters, let's look at some well-known baluns and see how they work - and when they might not.

CHOKE BALUNS

The simplest baluns are the ones that prevent surface currents from flowing, by forming the coaxial cable into an RF choke at the antenna feedpoint. (The currents flowing inside the cable are quite unaware that the cable has been coiled up.) At its very simplest, a choke balun can be just a few turns of cable in a loop of diameter six inches to a foot (**Fig 4a**), and in some circumstances this may be all you need. Alternatives are to wind the cable around a toroid or a ferrite rod (**Figs 4b and 4c**). Yet another alternative popularized by W2DU is to feed the cable through ferrite tubes or beads to form a sleeve (**Fig 4d**); this is generally lighter and more compact than a coiled choke, but somewhat more expensive. Ideally the cable should be a close fit inside the ferrite sleeve, and this may not be easy to achieve with readily available materials.

The VHF or UHF equivalent of the choke balun is the quarter-wave sleeve or 'bazooka' (**Fig 4e**). The sleeve forms an additional section of coaxial line over the outside of the cable, and this outer

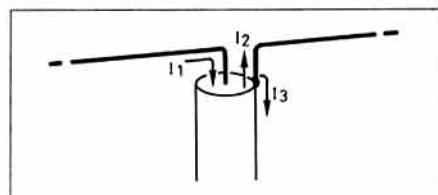


Fig 3. If the antenna currents on either side of the feedpoint are unequal, the difference $I_3 = I_1 - I_2$ will flow down the outside of the cable.

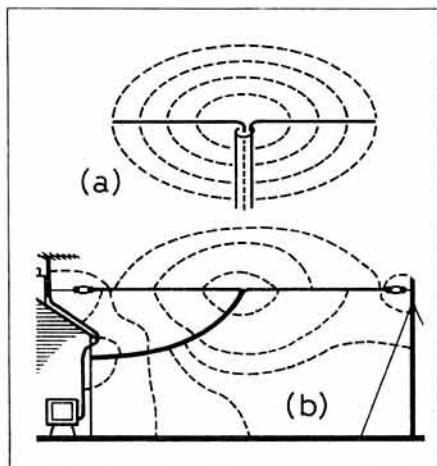


Fig 1. (a) Idealized picture of electric field lines around a coaxial-fed dipole. (b) the typical reality.

line is short-circuited a quarter-wavelength away from the feedpoint. At the feedpoint, a quarter-wave distant, this short-circuit appears as a high impedance against currents flowing onto the outer surface of the coax. At its resonant frequency, the bazooka thus acts as an RF choke on the outer surface of the feeder.

The power rating of any choke balun is essentially that of the cable itself. Even if magnetic material is involved, the main feeder currents cancel inside the cable, leaving only the small residual surface current to magnetize the core.

Although choke baluns will prevent surface currents from flowing at the feedpoint itself, electromagnetic coupling between the antenna and points further down the feedline may induce surface currents which the balun cannot prevent. This will happen if the installation is asymmetrical.

Induced currents become much greater if the feedline length is resonant, producing greater RF voltages on the line and on the equipment in the shack. The resonant length has to be measured from the feedpoint, down the coaxial cable, through the equipment in the shack, and away to down to RF ground via various lengths and loops of wire and metal plumbing. There can be many additional loading effects which alter the resonant length from its free-space value, so it can be very difficult to identify the exact causes of feedline resonance. This can lead to mysterious complaints such as 'Ever since I put in this new coax, I've had RF in the shack! Should I send the cable back?'

So if a choke-type balun fails to suppress feedline currents, the solution is to *leave the balun there*, but also place further RF chokes (Figs 4a, b and c) at intervals down the feedline to interrupt any resonant current distributions. A suitable interval would be a quarter-wavelength, or in a multiband system you could use pairs of chokes 2.5-3m apart, avoiding half-wave separations at any frequency in use.

TRANSFORMER BALUNS

A balanced antenna feedpoint will present an equal impedance from each side to ground. The accusation levelled at choke baluns is that they treat the symptom (the surface current I3) without attempting to correct the imbalance that causes it. A transformer balun, on the other hand, does create equal and opposite RF voltages at its output terminals, relative to the grounded side of its input. This works fine in the laboratory; but up in the air where the balun is located, what exactly do we mean by 'grounded'?

Transformer baluns may or may not involve a deliberate impedance transformation. We are probably all familiar with the basic 1:1 and 4:1 baluns; Fig 5 shows a wire-wound 1:1 balun, and both wire-wound and coaxial-cable versions of the 4:1 type. These all have the common property of forcing balance at their output terminals by means of closely-coupled windings within the transformer itself. The 4:1 balun in Fig 5b is the easiest to understand. Typically, it transforms 50Ω unbalanced to 4×50=200Ω balanced. This is achieved simply by a phase inversion. An applied voltage v at one side of the feedpoint is converted by the transformer action into a voltage $-v$ at the other side. These two voltages 180° out of phase represent the balance we are seeking to achieve. The 4:1 impedance transformation arises as follows. If the original voltage on the feedline was v , the voltage difference between opposite sides of the feedpoint is now $2v$. Since impedance is proportional to voltage squared, and $(2v)^2 = 4v^2$

In Figs 4-11, U = unbalanced,
B = balanced.
The impedance is typically 50Ω
unless noted otherwise.

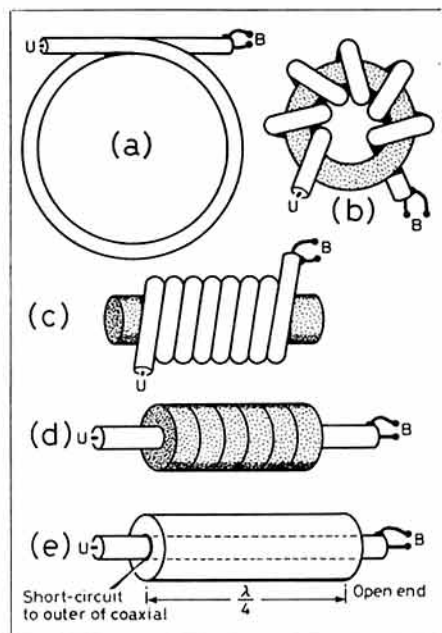


Fig 4. Five varieties of choke-type balun. (a) Coil of coaxial cable (typically 6-10 turns — only one turn shown). (b) Coaxial cable on toroid. (c) Coaxial cable on ferrite rod. (d) Ferrite sleeve. (e) Quarter-wave sleeve or 'bazooka'.

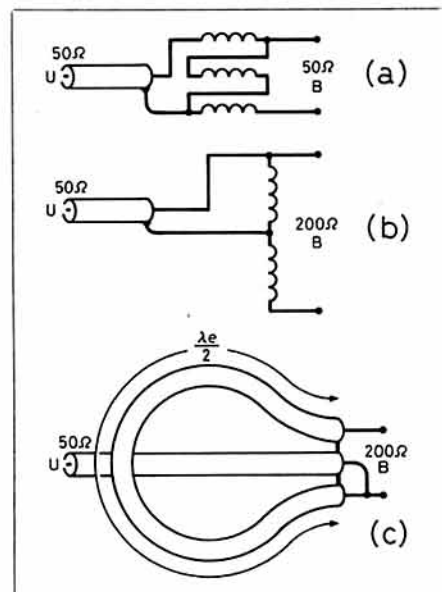


Fig 5. Transformer-type baluns. Windings shown separately are bifilar or trifilar wound, possibly on a ferrite rod or core. (a) Wire-wound 1:1 (trifilar). (b) Wire-wound 4:1 (bifilar). (c) Coaxial 4:1. The half-wavelength includes an allowance for the velocity factor of the cable.

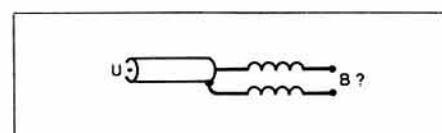


Fig 6. A bifilar 1:1 balun is rather ineffective.

the impedance is stepped up by a factor of 4.

In the wire-wound 4:1 balun (Fig 5b), the 180° phase inversion is achieved by the connection of the windings, while the coaxial equivalent (Fig 5c) does it by introducing an electrical half-wavelength of cable between opposite sides of the feedpoint. Strong coupling between the windings or inside the coax forces the whole system into balance.

Or does it? If you treat any balun as a 'black box' and look at the currents flowing in and out, you will find that any current difference between the two sides of the antenna has nowhere else to flow but down the outside of the coax [1]. But that does not mean that the balun is no better than a direct connection; when you insert the balun, it forces the currents in the antenna to readjust themselves to become more symmetrical. To make a meaningful evaluation of the effects of a balun, you therefore need to include the entire antenna and its surroundings in your analysis.

Any unbalanced antenna/feedline system will always 'push back' against an attempt to force it into symmetry. So although the transformer balun may do a good job, it still may not achieve total equality between the currents on opposite sides of the feedpoint. That may leave a residual difference current I3 to flow down the outside of the coax, as noted above. Unfortunately, having made its effort to minimize that difference current, the transformer balun does nothing to prevent it from flowing onto the surface of the feedline. This implies that a transformer-type balun may require additional RF chokes, at the balun itself and possibly further back down the line.

PROBLEMS WITH BALUNS

Some people swear by baluns, while others swear at them because they allegedly cause mismatches, get hot, generate harmonics and spread despondency. Many of these problems are not the fault of the balun itself.

A 'pure' choke balun acts only on the outside of the feedline, and cannot introduce any impedance mismatch on the inside. However, introducing an innocent choke balun can in fact change the VSWR. You may even find that the VSWR changes when you insert an extra length of coax, which is totally contrary to the theory of standing waves! The VSWR measured anywhere along the feedline should always be the same, says the theory — but only if the load impedance hasn't changed. And that is the clue to the puzzle. Recall that if the system is unbalanced, the outside of the coax becomes part of the antenna itself. So when you change the feeder length, you are in fact altering the whole antenna system and changing the distribution of RF currents upon it. The change in currents at the feedpoint will indeed change the load impedance, so that changes the VSWR.

Yet another complication is that some VSWR meters are not RF-tight, and permit a crossover of currents between the inside and outside of the coaxial line. Such meters will react to changes in out-surface currents, with a constant VSWR.

The sensitivity of the VSWR to the length of feedline can be a very good test of the effectiveness of a balun in your particular situation. Simply add an extra quarter-wave of feedline, using well-matched coaxial connectors, and see if the VSWR varies. The variations with a balun in place should be markedly less than without one.

We can now deal with another well-worn question. Can you avoid the need for a balun by

providing a perfect resonant match? The answer is 'NO'. Impedance matching, as measured by the VSWR, occurs entirely inside the coaxial cable, whereas antenna balance and feedline radiation happen in the world outside. So VSWR and balance are totally separate issues unless they interact at the antenna feedpoint, the only place where the inside and outside are joined. To stop that interaction, you always need a balun.

Having sorted out those misconceptions about impedance mismatches which are not really the fault of the balun, what about the genuine mismatch problems caused by the balun itself? Many papers and articles have been written about this, and especially about wire-wound transformer baluns [2-6]. The fact most overlooked by amateur constructors is that the windings of the balun form an extra section of transmission line between the coaxial cable and the antenna. In order to match 50Ω cable to a balanced 50Ω load, the transformer windings must themselves be 50Ω lines. Now it so happens that two pieces of enamelled wire twisted together, or laid close and parallel, will make a transmission line with a characteristic impedance of about 50Ω — but not exactly, so some impedance mismatch can arise. Distributed capacitance between the turns of the transformer can cause unwanted resonances which create impedance mismatches and throw off the balance, and so too can the leakage inductance due to carelessly loose coupling between windings.

We can examine these problems further by looking at a few practical types of balun.

PRACTICAL HF TRANSFORMER BALUNS

First, let's look at one which is hardly a balun at all. This is the type of 1:1 wire-wound balun shown in Fig 6, which is simply a length of 50Ω twin-wire line wound into a bifilar choke. If a load which is already well balanced needs to be connected to an unbalanced source, this type of balun will let it happen; but it won't contribute much positive help. Since the impedance of the twin-wire line is unlikely to be exactly 50Ω, you would probably do better with a fully coaxial choke balun.

The performance of the 1:1 balun is improved dramatically by adding a third winding (Fig 5a). This provides a necessary current path from end to end of the choke, without upsetting the desired voltage and phase relationships. The third (tertiary) winding must have close magnetic coupling with the other two. This is usually achieved by winding all three wires together, either laid parallel or twisted, in a trifilar winding. G6XN gives some good advice about techniques for wire-wound baluns [5]. Instead of twisting the wires, you could wrap three straight wires together with plumber's PTFE tape as suggested by GM4GSJ, and then wind all three onto the former or core; the tape makes the wires lay down flat and parallel.

A successful alternative to the three-wire 1:1 balun is to keep the two main wires coaxial, and lay the tertiary winding close alongside as shown in Fig 7 [2]. This has the advantage of avoiding impedance discontinuities in the main line. The constructional technique suggested in the original article was to strip the outer insulation from thin coax, and to bind the enamelled tertiary wire closely to the coax using heat-shrink sleeving. PTFE tape would work equally well, but would require additional waterproofing. The fact that one wire is inside a coaxial cable, one is outside and the third 'wire' is tubular has no effect on the magnetic coupling between all three. This type of

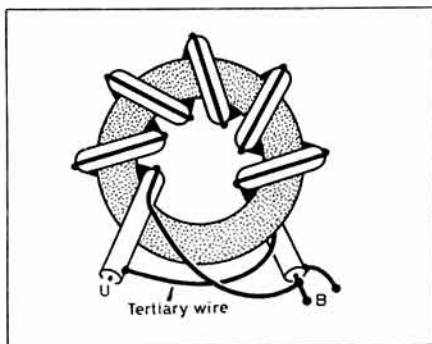


Fig 7. Toroidal trifilar balun using coaxial cable plus a tertiary wire

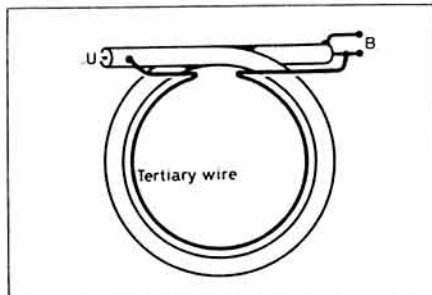


Fig 8. The coaxial choke balun of Fig 4a can be improved by adding a tertiary wire. For 14-30MHz, make a two-turn coil using 600mm of cable and the same length of wire, plus small additional lengths for connections.

construction is reported to give excellent performance with a particularly good impedance match.

The simple choke balun of Fig 4a can be improved in a similar way by adding an extra tertiary wire to the coil of coax. This converts the choke balun into an air-cored version of Fig 7 [6], which should be suitable for the 14-30MHz range. Fig 8 shows the construction; as with the toroidal version, the coaxial cable and tertiary wire must be bound very closely together, with short connections where the tertiary wire crosses over.

BROADBANDING AND MAGNETIC CORES

Most types of HF balun are designed for good broadband performance, typically for use with 3.5-30MHz multiband dipoles or 14-30MHz beams. The limits on performance are usually expressed in terms of accuracy of amplitude balance from

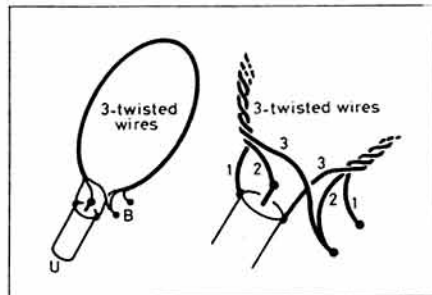


Fig 9. Air-cored trifilar 1:1 balun for 14-70MHz by G3KJC. The 50Ω trifilar transmission line is made from three lengths of 1.6mm enamelled copper wire. Holding one end of the bundle in a vice and the other end in a hand-drill, stretch the wires straight and parallel and then make 20 regularly spaced twists along a 500mm length. Coil the wires up 2 turns and make short cross connections as shown.

side to side, accuracy of phase angle, and VSWR. Balance within 1dB, a phase angle of $180 \pm 10^\circ$ and a VSWR of less than 1.5 into a balanced load are generally regarded as adequate performance at the edges of the operating band. In fact all of these characteristics tend to be related.

The high frequency limit of performance is approached when the distributed capacitance of the transmission line becomes series resonant with its leakage inductance [5]. At the series-resonant frequency, somewhere around 50-100MHz for typical HF construction, the balun becomes completely useless, and in practice it should not be used above half that frequency [2]. The lower frequency limit on performance is set by the requirement that the reactance of the inductive winding must be several times the circuit impedance. If we require the reactance to be eight to ten times 50Ω at 3.5MHz, the inductance of the winding should be 20-25μH. Since a large number of turns would spoil the HF response, a magnetic core is generally used to extend the broadband performance on the LF side.

Conventional toroidal baluns are generally made with either 10-12 trifilar turns on a 'number 2' iron-dust core of permeability 10, about 6 turns on a nickel-zinc ferrite core ($\mu = 120$), or 3-4 turns on a high permeability ferrite core. With proper construction, all of these baluns can have excellent performance down through 3.5MHz, and may still be going strong at 1.8MHz. However, their performance at 28MHz may deteriorate if either the leakage inductance or the electrical length of poorly matched twisted-wire line are becoming significant; these are potentially more serious problems for the baluns which use greater numbers of turns on a lower permeability core.

G6XN has pointed out that it is not necessary to use a toroid; six or seven trifilar turns on a medium-wave broadcast type of ferrite rod will work perfectly well, and at far less cost [5]. Such a balun has rather less series inductance than the normal toroidal balun, so it shifts the whole performance band upwards in frequency. The performance of G6XN's type of balun is excellent, especially on the higher HF bands. I have built several using six trifilar turns on pieces of scrap ferrite rod. Although originally intended for 14-30MHz, with careful construction they are usable at 50MHz upwards, and cost next to nothing.

Poorly matched loads can ruin the performance of a balun, particularly at the HF end of its range where the length of the coiled transmission line may approach an electrical quarter-wave. The resulting high VSWR and increased circulating currents can cause saturation of high-permeability ferrites. This in turn can lead to overheating, and either temporary or permanent loss of magnetic properties. The solution is to avoid mismatches in the first place — which implies that the output side of an ATU is often not a good place for a balun with a magnetic core — and also to use larger sections of magnetic materials which are less prone to saturation. A balun wound on a straight ferrite rod is much less prone to saturation than a toroid, because most of its magnetic circuit is 'air gap' rather than ferrite.

The high-frequency balun designed by Roy Church, G3KJC, uses no magnetic core at all. The balun shown in Fig 9 works from 14MHz to at least 70MHz and is wound on fresh air! A coil of trifilar twisted wire provides plenty of series inductance for these frequencies. The secrets lie in getting the right number of twists per inch to make a good 50Ω transmission line, coiling up the wire to create

the necessary series inductance, and making short VHF-type connections between the various windings. It is virtually impossible to overload or damage this balun by either raw power or high VSWR. Having no core, there is nothing to saturate, and the voltage breakdown is limited only by the quality of the enamel - the prototype survived 3kV DC between adjacent wires! As with any balun, it should be mounted reasonably far from metal objects, particularly those made of magnetic materials.

TESTING HF BALUNS

Low-power tests on HF baluns can be made using a balanced dummy load consisting of two resistors in series. You don't need a professional vector impedance meter or network analyser to tell the difference between a good balun and a poor one. You can measure the VSWR of the balun on all the amateur bands in the normal way. Frequency-swept measurements using a general coverage receiver and a noise bridge can be even more revealing, especially if you can extend them up to about 100MHz, where most HF baluns look extremely sick! By grounding the centre-tap between the two load resistors, you can also measure amplitude balance using a high-impedance RF voltmeter or oscilloscope.

The main high-power test is of insertion loss. Since a high-power balanced dummy load may be difficult to arrange, the best way to carry out this test is to make two identical baluns and connect them back-to-back between the transmitter and a normal coaxial dummy load [5]. With the aid of an RF wattmeter you can estimate the power loss in the pair of baluns, though a simpler test is to feel their temperature after a few minutes carrying full power. The balun might reasonably become warm to the touch; if it gets really hot, it is either under-rated, badly designed or badly constructed.

WHICH HF BALUN IS BEST?

The question of choke versus transformer baluns has generated fervent debate for years (especially among people who believe that every issue can be resolved by confrontation). So don't expect me to end all that in a few paragraphs! The underlying question is whether antenna imbalance should be tackled by eliminating feedline currents, or *vice versa*. Since each follows from the other, like the proverbial chicken and the egg, both answers are equally right - or wrong.

More to the point, W7EL has made some direct comparative tests between choke and transformer baluns in something approximating a real situation. The baluns were inserted between a horizontal 28MHz dipole and a half-wavelength of coaxial feeder [1]. Since the transmitter end of the feeder was well grounded, this feeder length presents a particularly low impedance to surface currents at the feedpoint, and places great demands on the balun. W7EL measured the currents in the dipole at both sides of the feedpoint, and also the imbalance current on the surface of the coax. He found that even minor physical asymmetry in the installation resulted in marked electrical asymmetry; and that both types of baluns produced improvements.

Many amateurs have found this for themselves. Whichever type of balun cures your particular problems (such as RF in the shack or EMC), it's good enough. However, in W7EL's experiments the choke balun produced consistently better improvements in balance than the transformer type. This is consistent with the lack of direct

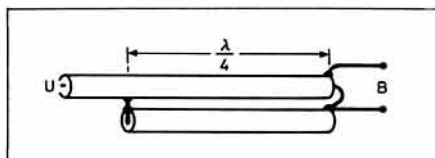


Fig 10. Pawsey stub quarter-wave 1:1 balun.

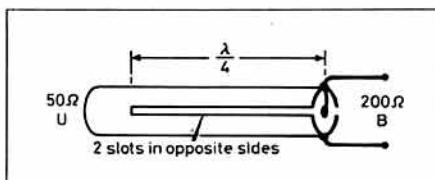


Fig 11. UHF version of the half-wave 4:1 balun.

effort in the transformer balun to suppress feedline surface currents. On the other hand, we hear plenty of stories of choke baluns that failed to work too.

The verdict is that either type of balun at the feedpoint will have a positive effect, but that the 'best HF balun' depends entirely on your particular circumstances and the problem you wish it to cure. Whichever balun you use, you may also need to wind the coax into additional RF chokes to remove the last traces of outer-surface currents.

VHF AND UHF BALUNS

At VHF and UHF there are generally fewer difficulties with imbalance created by the antenna's surroundings. The problem is usually the difficulty of making a symmetrical junction at the feedpoint, because the lengths of connecting wires and the necessary gap at the centre of a dipole become significant fractions of the wavelength.

For all its popularity, the gamma match is not a balun. It does nothing to create balance between the two sides of a dipole; on the contrary, it relies entirely on electromagnetic coupling between the opposite sides of the dipole to correct the imbalance of the gamma match itself. When used with an all-metal Yagi, the direct connection of the coax shield to the centre of the dipole invites the resulting imbalance currents to travel along the boom as well as the outer surface of the feedline. I have used a gamma match successfully at 50 and 70MHz, but personally would not recommend it for 144MHz or above.

The quarter-wavelength 'bazooka' or sleeve balun has already been mentioned as a VHF/UHF example of a choke balun. Although reasonably successful when used with a well-balanced load, it does little to create balance where none already exists. The Pawsey stub 1:1 balun (Fig 10) uses direct connections to a quarter-wave stub instead of relying solely on electromagnetic coupling to create a high impedance against surface currents. However, it requires very short connections at the feedpoint and thus is difficult to construct for UHF. Unless provided with a sliding short-circuit bar to achieve exact quarter-wave resonance, the Pawsey stub may introduce phase-shifts and other problems of its own.

The coaxial half-wave balun is definitely the 'best buy' for all VHF/UHF bands up to at least 432MHz. It strongly enforces balance, yet it does not introduce an impedance mismatch unless the cable or its length is markedly different from a true electrical half-wavelength. The problem with using this balun is that the feedpoint impedance of the antenna must be transformed up to 200Ω. Fortu-

nately, this is often very simple. For example, the highly successful family of DL6WU long Yagis [8] have a feedpoint impedance which is close to 50Ω at the centre of the dipole driven element; this impedance can be raised to the necessary 200Ω simply by converting the driven element into a folded dipole. Other alternatives for creating a symmetrical 200Ω feedpoint impedance include the T match and the delta match [5].

The impedance of the coaxial cable used in a half-wave balun is not important, though a characteristic impedance of one-half the load impedance (ie in most cases 100Ω) has been shown to give optimum broadband balance [7]. Low-loss 100Ω coax is difficult to obtain, though, and it is perfectly adequate to use good-quality 50Ω cable, carefully cut to length with an allowance for the velocity factor.

As the frequency increases, constructional techniques can change to take advantage of the decrease in wavelength. Although an accurate half-wave loop of coax can become quite difficult to make at frequencies above 432MHz, it becomes possible to use a different form of construction instead in the 4:1 balun of Fig 11, the end of the solid outer shield of the 50Ω coax is slit back a quarter-wavelength on opposite sides, and the 200Ω load is connected across the separated ends of the shield. The inner of the coax is connected to one side. This works as a 4:1 balun because the final quarter-wavelength of cable supports two electromagnetic transmission-line modes. Firstly there is the normal coaxial mode, which is largely unaffected by the slits in the shield. The second mode is a half-wave resonance from one side of the feedpoint to the other, which creates a 180° phase inversion in just the same way as the more obvious half-wave of cable.

SUMMARY

This article has explained how baluns work, from HF to UHF — and how they might not work in certain circumstances. In particular you may need to use additional RF chokes to prevent currents from being induced further along the feedline. I have also tried to resolve some questions about baluns and VSWR which have puzzled a lot of people for many years. Finally, I have mentioned a few less-common ideas for baluns at HF, VHF and UHF; I hope you'll try them for yourself. □

Special thanks to Roy Church, G3KJC for all his advice and helpful comments.

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Bardstown Middle School (Kentucky) teacher, Chris Luvisi, KC4IDX (1), adjusts the volume on the rig, while operator Jackie Saltzman, KC4INS, and other Novices chuckle over one of their contact's comments. (photos Terry Boyd, The Kentucky Standard)

The Bardstown Experiment

David Greer, WE4K, reported in QST how teaching amateur radio in an American school created a new generation of enthusiasts.

The day 10-year-old Rusty Ballard passed his Novice exam and ran down the hallway of Bardstown Middle School shouting, "I'm a ham, I'm a ham," I knew the hard work had paid off.

The hard work had produced an impressive scorecard: 63 students between the ages of 10 and 13 and two teachers had obtained their Novice licences. But they are more than merely licensed. They are active daily from a well-equipped classroom station. They are talking to the world on 10-metre SSB and loving it. More importantly, they are learning.

Can Amateur Radio hold any fascination for a generation that's computer literate, videowise and microwave open - jaded on compact disc before they enter kindergarten? I wondered - but the answer is yes.

They peppered me with endless questions: "How do I get a Ten-X number? When's the next hamfest? How do I make a dipole for 10 metres? What do I have to do to upgrade to General?"

I spent a whole day with the students about a month after they received their licences. Their enthusiasm for Amateur Radio was mushrooming due to their access to the classroom station and the excellent propagation that put the world at their fingertips. Over half said they wanted to set up stations at home.

However, all had not always been so rosy. Many of the students had gone into the ham radio course with great fear of the unknown. For many of them, it was the most difficult classroom challenge they had ever faced.

"You really don't know what it's like until you make your first contact," said 13-year-old Judge Carothers, KC4IMW. His view was shared by

many of the students. You can explain what Amateur Radio is all about and show videotapes back-to-back for months, but no one - particularly youngsters - can appreciate the allure of our hobby or the thrill of talking to exotic places, until they can actually see and operate an amateur station themselves.

"I didn't want to do it at first," said Rhonda Parrigin, KC4IMS, a 12-year-old sixth grader. "After you talk to somebody, it's fun. Now I want one of my own." I would soon learn that was an understatement. Rhonda became one of the most die-hard ham radio fanatics of the group.

"When we got the ham radio and we made our contacts, I got very interested," said 11-year-old Leslie Morgan, KC4IZW, a sixth grader.

Now, the students' everyday conversation is peppered with ham radio terms. Splatter, QRM, and DX are now part of their world.

"Learning ham radio is probably the most fun thing I've done in school," said 11-year-old Christy Hutcherson, KC4JAA.

Many of the students fondly recall their first QSO. "I was really nervous," said 13-year-old Beth Campbell, KC4INQ. "It was really an exciting experience." Twelve-year-old Sarah Lawson, KC4IMG, worked a station in the Canary Islands for her first QSO. "He said he'd never visited Kentucky," Lawson recalled. "I told him it was really pretty here."

Amateur Radio was proving to be a valuable classroom experience, according to Chris Luvisi, KC4IDX, the students' teacher. "One of our goals in gifted education is to teach communication skills and expose kids to different cultures," he said. "I've taught for nine years, and I've never

seen kids as excited as the day they passed their licence exams. They were afraid at first. It was something they'd never done before ... or even considered."

THE BEGINNING

The Bardstown Experiment, as I call it, began in the spring of 1988. As editor of the local newspaper, middle school teacher Luvisi had asked me twice to guest lecture his students on journalism. Luvisi's students are part of a programme for exceptionally bright and inquisitive students. They had impressed me with the quality of their questions during my presentation.

After my second visit, I began to think this might be the perfect opportunity to test a long-held personal theory that Amateur Radio offered its own version of a living classroom textbook with its emphasis on physics, geography, social studies, languages and learning the discipline of on-air operating procedures. Plus, the hobby gives youngsters the opportunity to interact with adults on an equal basis - in my opinion, a valuable experience.

I asked Luvisi if I could return later to make a presentation on Amateur Radio to one of his classes. He said yes, later admitting he was agreeable at the time only to return the favour of my speaking to his classes.

Armed with a videocassette of "The New World of Amateur Radio," the presentation was made. The students were enthusiastic about Amateur Radio, but Luvisi was even more hooked because he immediately saw the benefits of ham radio as a teaching tool.

That summer Luvisi began studying for his Novice licence. By fall he had designed a ham radio course for his fifth- through eighth-grade classes based on *Tune in the World with Ham Radio*. For eight weeks in the fall and early winter of 1988, 63 students and another teacher, Janet Strickland, Luvisi's assistant, studied ham radio daily for an hour.

It came time for Luvisi to take his Novice exam. Many of the students were wrestling with the Morse code and theory. Probably, some of them secretly hoped their teacher would fail his exam, so that he might decide it was really too difficult for the youngsters, too, and give up this "crazy" idea of making them all ham radio operators. No such luck - Luvisi passed his Novice exam with flying colours and became KC4IDX.

As the students continued to struggle with the code and theory over the next several weeks, I made several guest lecturer appearances. I answered questions galore. I emceed an Amateur Radio version of the old College Bowl TV quiz programme. We practiced CW. We sweated.

For many of the students, this was the most difficult academic challenge they had ever faced. However, they could not back out. Luvisi knew his students well. He knew school was too easy for most of them. Seldom had they been challenged in the classroom. That's why the course was designed so they could not fail. It wasn't allowed. That's why this radio course was not optional, as it often has been at other schools. It was mandatory. To pass the Novice exam meant getting an A in the class. To fail meant getting an F.

After beginning the ham radio course, some of the students who found it rough going wanted to drop out. Luvisi talked them into sticking with it, offering lots of encouragement along the way. Practice tests designed to be easily passed and build confidence were given before the one that counted. "Everybody succeeds," said Luvisi. "It just takes some longer than others."

Just before Christmas, Jim Brooks, N4SRT, president of the local Amateur Radio club, and I administered the Novice exams. Forty of the 63 students passed after the first round of testing. Other students were tested, tutored and retested until they passed. They were not allowed to fail.

THE PRESENT

After receiving their licences and getting on the air, nearly all the students said they were glad they had stuck it out. The effort had been worthwhile, they admitted. At least a third of the students are head over heels about ham radio.

"I felt like nothing could be worth this much trouble, but it was," said fifth grader Gail Smith, KC4ISM.

One of her classmates, 10-year-old Edmund Sauer, KC4ISL, was among the most hooked. Within weeks of getting his licence, Edmund had worked over 30 countries and had several DX QSL cards. He was maintaining schedules with hams in Europe and sounding like an old timer at the mike. Edmund's assessment of ham radio was simple: "I'm loving it!" he told me.

The students discovered that working DX had increased their awareness of geography. "It makes me want to visit those countries," said Steve McNear, KC4ING, a sixth grader.

"They flip through the *Callbook* and atlas the moment they hear someone," said teacher Janet Strickland, KC4INU.

Several of the students made their first contacts the day I spent with them. Jackie Saltzman, KC4INS, a seventh grader, snagged Frank, KX1T, in New Hampshire for her first QSO. Then she worked Al, K1WQU, in Vermont for her second contact. Then a station from California called. Pretty soon Jackie had a pileup going on the frequency. She handled it like an old timer.

Then LaToya Keene, KC4IZM, another seventh grader, made her first contact.

Ann Barnes, KC4INH, an eighth grader, called CQ and attracted the attention of two stations in the seventh call area on her very first call. Anthony Green, KC4IOF, let out a CQ and snared Mitch, NH6JC, in Hawaii.

"Can I go now?" another student asked Luvisi, as the youngsters competed for rig time.

"Our biggest problem has been we have one radio between 63 students," Luvisi said. Many students began coming to school early, skipping lunch or staying after school to operate the rig.

Not only were youngsters learning geography firsthand, but solar flares provided a valuable hands-on lesson in physics, too. The flares knocked out all HF communications for several days, and the students learned what effects these disturbances can have.

THE STATION

By obtaining grant money from local sources, Luvisi purchased a 30-foot tower, coax, rotor, power supply and a triband beam. The antenna was mounted on the school roof at a height of 45 feet by the local ham club, the Kentucky Amateur Radio Society. A Radio Shack HTX-100 25-watt



LaToya Keene, KC4IZM (centre), is all smiles while making her first contact.

transceiver was purchased as a first rig. The students loved it because it wasn't intimidating to use.

Luvisi estimates he spent less than \$1,500 on setting up the station. It was cheaper than one classroom computer. That made it easy to sell the concept to the school administration and superintendent.

Later, Kenwood USA generously donated a new TS-140S transceiver and power supply to the school. The HTX-100 and a 10-metre dipole became a loaner setup for students to take home for additional rig time.

Other schools began to take notice of the project's success and inquired about the program.

The students were well received on the air from other hams. Many contacts said they specifically enjoyed talking to a school. One was a ham in Botswana who said, "I couldn't resist. I called just because you were a school."

THE FUTURE

Interest in ham radio has been keen among students and teachers in the adjacent high school. Plans call for Luvisi to teach a ham radio course at Bardstown High School this fall. Plus, seventh and

eighth graders will take an upgrade course to Technician/General. The local ham club is putting together a volunteer examiner team, so students can upgrade locally. The purchase of VHF/UHF gear is on the agenda, so students can get involved in satellite work.

Plans call for the installation of a 2-metre repeater on the school grounds. The students are painting the tower with the school colours. The machine will belong to the local ham club.

CONCLUSIONS

Months after the project began, Chris Luvisi and I looked back and agreed the success had far exceeded our wildest expectations. We never dreamed all 63 students and both teachers in the gifted education programme could get their licences. We never thought the project would be so well received by the students, their parents and the community.

Many parents told me how much their children enjoyed learning about ham radio. The students were having fun, and the school and its administrators were supportive. What else could we ask for?

I asked the students which had been harder to learn - Morse code or the theory and regulations? Most said the code. Luvisi and I agreed that the seventh and eighth graders had the easiest time in learning the code. It was more difficult for the fifth-grade students. It seemed that the older middle school students had better developed study habits and longer attention spans, both vital in listening to a code cassette for 30 minutes nightly. Future teaching efforts may concentrate on the seventh and eighth grades, although individual fifth and sixth graders seemed to show the most enthusiasm for operating the classroom station.

Would the students have been interested in obtaining a codeless, VHF-only licence, if one had been available, I asked? They said yes - until I explained it would have excluded them from 10-metre DX. Then the answer was a resounding no.

For me, a mother's comment made while waiting to pick up her daughter summed up the story. School was over for the day and 12-year-old Rhonda Parrigin, KC4IMS, was at the rig calling CQ.

"Rhonda hated this stuff while Mr Luvisi was teaching it," said Mrs Parrigin, "but just look at her now. I can't get her to go home." □



The hams of tomorrow - today! Here are the Amateur Radio students of Bardstown Middle School. Sixty-three students between the ages of 10 and 13 and two teachers obtained their Novice licences.



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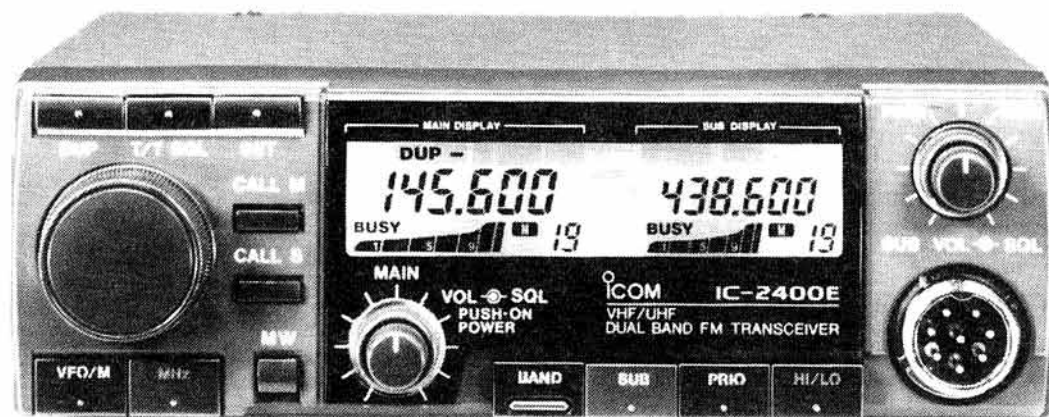
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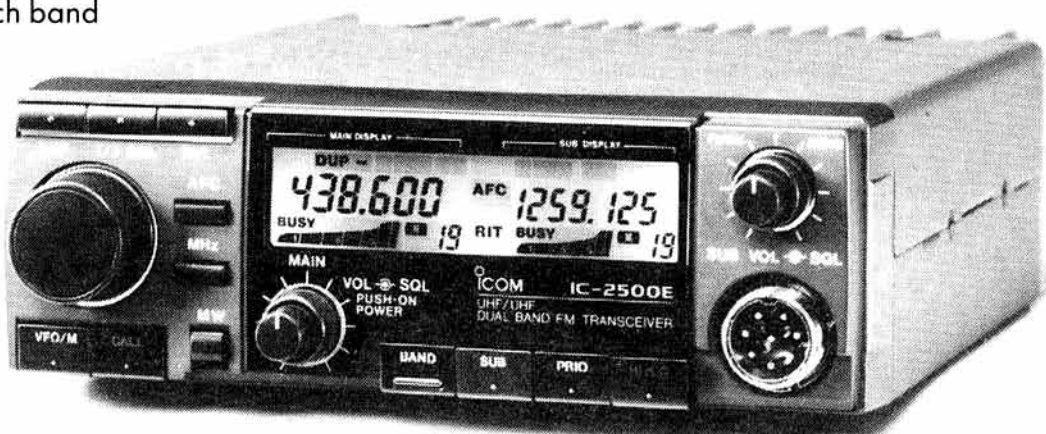
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The IC-751A is supplied for 12v operation but can be used with either internal or external A.C. power supply. It is fully compatible with ICOM auto units such as the IC-2KL linear amplifier and the AT500/100 antenna tuners.

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NEIL LASHER, G6HIU
40 Farm Road, Edgware, Middx
HA89LT

Win a TNC

First prize in the Christmas prize crossword is the much acclaimed PK88 Terminal Node Controller, all you need to get active on this most popular mode.



This 1st prize has been kindly donated by the committee of the Pickets Lock Amateur Radio Exhibition to be held next March at the Pickets Lock Centre London.

And there is a second prize too... a voucher for £30.00 against any of the products on offer from Siskin Electronics Ltd. Thanks very much to Phil Bridges.

The rules are very simple, and the competition is open to all of you readers who regularly read my column. It's also open to those of you who don't, with the hope that if you win, you will read every word in the future. If you are not eligible you will already have been told.

So when the words "Turkey for lunch?" make you want to find something else to do, sit down with this crossword (a photocopy will be accepted), and when completed send it to me at the above address, with your name and address. All correct copies will go into a hat, the winners will be drawn at RSGB HQ on or after January 16th, so all entries must be received by that date.

Proposal for 12.5kHz channel spacing

With the latest proposals now underway for the change over to 12.5kHz channel spacing on VHF, as of January 1991, questions are now being asked as to how it will effect packet and other data modes. Your opinions of the effects would be greatly appreciated and over the next few months I am prepared to air your views. If you have something to say, say it now - don't wait until 1991.

3.5MHz Mailboxes

Reported at the last Packet Working Group meeting in October, were details that all of the proposals with the DTI at this time for 3.5MHz may be issued under an experiment, providing that they do not cause interference. By the time you read this they may even be on air. The stations concerned are:

GB7ERA Shrewsbury
GB7BNI Belfast
GB7LDI Norwich
GB7GUR Guernsey
GB7MAC Airdrie
GB7PLY Plymouth

As you can see these are spread well enough over the country to create a backbone on 3.5MHz.

AEA PMS Available

AEA have made available PMS software for the PK232; the bad news is although it will be standard on TNCs purchased in the USA, AEA have not extended this facility to the rest of the world. If you require the PMS facility for the PK232 it is only available here as an optional extra.

New concepts in Packet Radio

The yuppie has at last arrived. Yes the latest in the line of new technology TNCs has arrived from PacComm. Similar in size to a very small hand held transceiver and run on nicads, it will fit in your pocket. With a list of small hand held computers available, are we about to see the first portable packet stations on the air?

The second new concept is a new PC card shortly to be released that has been designed by Simon Taylor G1NTX. It is a half card for 9600 baud modem using one of three single chip technologies. The three chips are:

R96MFX - CMOS single chip modem.

R96EFX - as above, but with HDLC and voice TX/RX mode.

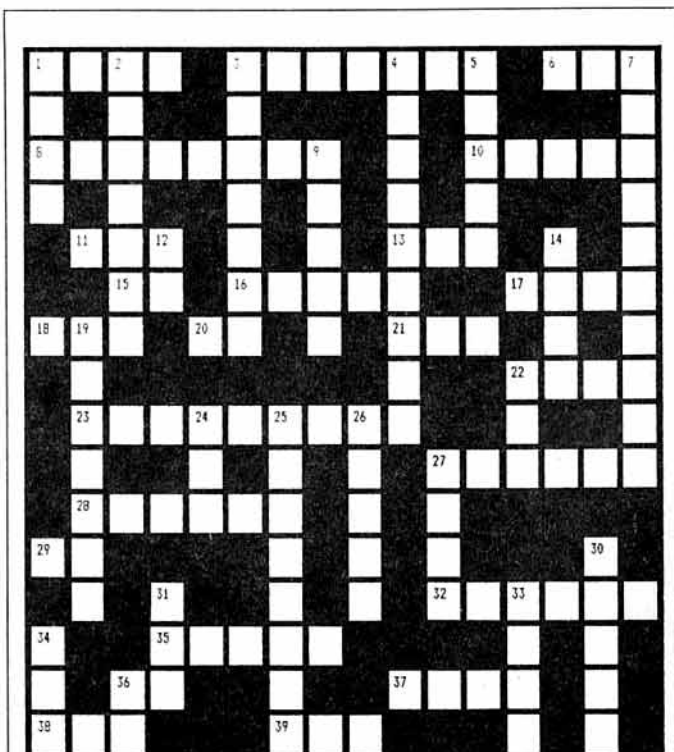
R96DFX - as R96EFX, but with DTMF RX capability.

The difference in concept is to connect the data modem via the audio connections of the rig, and operate in a similar way to the technique used on 3kHz bandwidth telephone systems, instead, (as has been adopted at this time), of the method that has to be connected directly to the I.F. strips and modulate the carrier with data.

As of this time this method has been tested at 9600bps and plans are to attempt speeds up to 14400bps. (Thanks to Simon for the above information.)

News from the PWG

A lot of people ask "does the PWG (Packet Working Group) still exist?" Last month saw the start of information bulletins being sent to all from the PWG, which seem to have been a big success, giving all the latest changes and information as it happens. I should also report that Mike Dennison, G3XDV, has stepped down as Chairman, and the new Chairman elected is Ian Suart, GM4AUP. Mike will however be



The Clues

ACROSS

1. Flowering software (4)
3. Plastic pigeon (7)
6. Switch on to illuminations (3)
8. Chances of survival are nil (8)
10. They stay in hard come out floppy (5)
11. Can't buy this property (3)
13. Large self esteem (3)
15. Each bulletin has one (2)
16. Capital of Canada is real (5)
17. Command to be informed at all times (4)
18. Turn on and get your own back (3)
20. What the spouse calls the computer (2)
21. The second function (3)
22. The emanating note (4)
23. Between two or more (9)
27. Wrapped in brown paper (6)
28. Hilltop signal (6)
29. When the bank doesn't say yes (2)
32. Putting the piano in order (6)
35. Standard letter (5)
36. Start sending (2)
37. Rate of descent (4)

38. Plug in to a fairground attraction with ice (3)
39. SysOp postcode (3)

DOWN

1. This creed love this mode (4)
2. Undress behind these for a clearer view (7)
3. Join them together (7)
4. The mail travels from place to place (9)
5. Do air breathers need air (5)
7. Say good-bye (10)
9. At what stage shall you play (5)
12. Where it is sent (2)
14. You've heard it all before (4)
19. The postman delivers every hour (7)
22. Intelligent black box (3)
24. Interference (3)
25. Serves a purpose (8)
26. It's in the post (5)
27. After dinner tittle (4)
30. Data entry (5)
31. Whether it would be printed (3)
33. Say no to the beginning of delivery (4)
34. Make a reservation in the North Sea (3)
36. 12 down all over again (2)

staying on as an active member and thanks are due to him for all the hard work he has done while in the chair. As you can see the PWG is alive and well, representing the packet community.

Lastly, just to bring a smile for this time of year, I recently reported that the DTI was about to allow the RSGB to issue Notice of Variations

for certain frequencies on 70MHz and 432MHz; guess who was the last person to be informed... John Theodorson, G4MTP, who just happens to be the National Co-Ordinator for mailboxes in the UK.

Well that's all for this month except to wish you all a very Merry Christmas and a Happy and healthy New Year.

ARTHUR GEE, G2UK

21 Romany Road, Oulton Broad,
Suffolk NR32 3PJ.

Greetings to all those who have been interested in this column before and to the numerous 'beginners' who would like to get into the satellite scene.

The 'satellite scene' has reached something of a division in its future course. There is on the one hand a section of satellite enthusiasts whose interest has taken them into the realms of high technology; in many cases they have in fact become professionals. And then there are those who are rather disparagingly called 'beginners', who would really like to 'get into satellites', but who are put off by the apparently complicated, costly, equipment which seems necessary, to judge from the activities of the 'professional' group.

I hope to cater for both groups in this column, during the next few months. For the 'professionals', I hope to provide information which may come my way, which may not necessarily have come to their notice. For the 'beginners' — I shall prefer to call them 'newcomers' — I hope to be able to show them how they can get into satellites with no more problems than they encounter in their more usual amateur radio activities.

History of Amateur Satellites

It might not be a bad idea to start off by recounting just how this business of satellites all began.

The idea of having satellites for amateur radio communication probably owes its birth to a small group of radio amateurs in the Los Altos area of California, USA. They were keen VHF enthusiasts and being dissatisfied with the short range of communication on those frequencies they decided to see if they could build a satellite from which they could reflect their VHF signals down to earth and thus reach out to distant VHF stations. One of this group, Don Stoner, wrote an article outlining his ideas, which resulted in a committee being set up to see if his scheme was practical. This became known as the 'Project Oscar' organisation — OSCAR — standing for Orbital Satellite Carrying Amateur Radio.

They worked on the project for two years, mostly in their own time, each member applying his own specialist knowledge to the project. A satellite was successfully built. It weighed 10 lbs and carried a simple radio transmitter working from batteries sending the signal 'hi-hi' on the two metre band. Launching facilities were provided for it on a

'Discoverer 36' space rocket and it was successfully launched on the 12th December 1961 from the Vandenberg Air Force Base. It was the first non-military, non-governmental, non-commercial satellite to be launched.

The launching of this first OSCAR probably presented more problems than the construction of the satellite itself. Tradition has it that, due to the fact that a space rocket has to weigh exactly its designed weight at take-off, adjustments to its weight have to be made by adjusting ballast. So it was agreed that OSCAR 1 could take the place of some of the ballast! Whether this is true or not, it is a fact that the second problem was how to separate OSCAR from the rocket to put it into orbit, the rocket of course being primarily intended for its official primary satellite load, which was being launched into a higher orbit. This problem was solved by mounting it on a spring, purchased from a local hardware store, which could be released at the appropriate time, ejecting the OSCAR into orbit. This primitive first amateur satellite worked perfectly. Over 5,000 listener reports were sent in from over 570 amateurs in 28 countries. It completed 318 orbits before re-entering the earth's atmosphere and burning up.

Encouraged by this success, a second one was built and successfully launched six months later. Somewhat more sophisticated than the first, it transmitted information on the temperature of its surroundings, increasing or decreasing its keying rate depending on the temperature. Oscar 3 followed and was the first true communication satellite for amateur radio use. It was put into a 570 mile high orbit on the 9th March 1965. It carried a receiver and transmitter working in the 145MHz band; signals were received from ground stations at one end of the band and retransmitted back to earth at the other end of the band. 176 two-way QSOs were made by 98 stations in North America and 31 in Europe.

At the time of writing more than a dozen satellites for amateur radio use have been built. Readers who are interested in reading further about these can find details of them in *Amateur Radio Satellites — The First 25 Years*, available from RSGB Book Sales.

This series of satellites has provided radio amateurs with an increasingly sophisticated means of communicating over long distances with a reliability far exceeding that possible from ionospheric propagation. Real DX can be

worked with far less expensive equipment and greater ease of operation. Quoting from a recent letter from an AMSAT-UK member in Cheshire: "As you know, I have not been licensed long, but have been a member of AMSAT-UK since my interest in radio began, therefore I have been able to acquire a great deal of information on the 'beginners' satellite, ie R.S. 5, 7, 10 and 11. I say 'beginners' satellites' because of the ease with which these can be worked. My own set up is a 10 watt transmitter into a 'Discone' antenna and a dipole for reception on 10 metres. So my first contact in amateur radio was via R.S. 10, with no problems! Other newly licensed people I have been speaking to on 2 metres, who do not have the 'experience' or knowledge of the R.S. satellites (i.e. the Russian ones) have expressed an interest in satellite working. One in particular purchased his first radio with a view to satellite communication. He was quite taken aback when I explained to him that I had worked a satellite with just 10 watts and a Discone on 2 metres. He was labouring under the very common misapprehension that to 'do' satellites you need a 60 watt linear on 70 cms., a 40 element crossed yagi, AS-EL rotators, and so on. So to prove my point he listened to me operating on R.S. 10 and was impressed and then had a go himself and succeeded in hearing his downlink signal. To cut my long story short, that newly licensed amateur worked a satellite due to information I had given him — a 'non-official' information source. He had equipped himself with equipment for Phase 3 operation without any inkling of the existence of the Phase 2 satellites. Why? Because not enough information is put out for beginners.

Something is amiss somewhere. In my opinion it is that too much emphasis is placed on the 'complicated and expensive' Phase 3 satellites resulting in the high power, rotators, friendly bank manager syndrome becoming the 'norm' for satellite operation resulting in amateurs dismissing satellite working out of hand. The 'experienced' G1XXX tutor who taught a class of hopeful RAE candidates — including me — on being queried about satellites, said to the class that you need 70cms, 1kw, etc. How many stations now licensed will give no further thought to satellites as a result of ONE amateur's misinformed information?"

The above was quoted from a letter from a nineteen year old 'newcomer'. It expresses the writer of this column's views entirely.

It's easier than you think!

Further justification for these views was expressed by 'an old hand' writing in the June 1989 issue of AMSAT-UK OSCAR NEWS. Dave Lane, G3VOM, writes: "Whilst listening to some amateurs talking about satellite communication, you often gain the impression that unless you have a computer, a University degree, a lot of power and an expensive antenna array, you're wasting your time. This is just not true! You can do without all those things yet still manage to have reasonable QSOs on some satellites. Two months ago I decided to get back to basics to see just what was possible using simple equipment — well to tell the truth, my orbital prediction computer program was fouled up and my elevation rotator was bust! I was surprised by the results.

"The R.S. satellite seemed the easiest one to attempt contacts through, so I switched on the receiver to the beacon frequency of 29.357 MHz and there it was!

News

Turning now to current news of the satellite scene. UoSAT 1, the satellite built by the University of Surrey Spacecraft Engineering Research Unit for educational and scientific purposes, was launched from the Western Test Range in California on 6 October 1981. It has remained functional for several years longer than was expected which speaks well for the thoroughness of its constructors. However, it completed its mission by re-entering the earth's atmosphere on Friday 13 October 1989, at around 0730 GMT. It came down over the Pacific Ocean, at Latitude 046 degrees South and Longitude 220 West. Its last signals were heard in the U.S.A. at 0343 UTC. AMSAT-UK ran a competition for participants to predict the day of its decay. It was won by Geoff Roberts, G3ENY. Congratulations Geoff for some very accurate calculations.

We are glad to report that Ross, WB6GFJ, who attended the AMSAT Colloquium at Surrey University last July, and who is a very prominent member of the satellite team in San Francisco, is safe and well following the recent earthquake there. Apart from his house 'jumping' up about a foot, the windows all being out, all the crockery being smashed and the sewer broken, all is well! Ross met many AMSAT-UK members during his visit here in July and we are pleased to be able to reassure those who have enquired about his safety that he is alive and uninjured.

MIKE DIXON G3PFR

'Woodstock', Grazebank, Norley,
Warrington, Cheshire WA68LL

Seasons' Greetings

It seems no time at all since I was writing last year's December column, passing the seasons' greeting and wishing all microwave operators a successful and fruitful year of operating. May I do the same again for this dying year and the new year to follow?

This year has not been all that successful in the sense that general levels of activity seem to have been down on previous years, despite the prolonged spell of good weather and with it the possibility of tropo-openings. From where I sit, even activity levels on the VHF and UHF bands could hardly be described as spectacular, even though there have been some quite spectacular Auroral and Es-openings on 6m, 2m and, occasionally, on 70cm. I suppose that it could be associated with higher levels of activity on the HF DX bands. Things might change as the current sunspot cycle goes into decline from 1990 onwards and the openings on 10, 12 and 6m become less frequent and prolonged!

The Microwave Committee review, elsewhere in *RadCom*, shows good progress to have been made on some fronts — particularly in design, publication and work towards helping the proposed Novice Licence. For novice, I guess you should really read any beginner, since much of the work on simpler, low powered microwave gear is applicable to the 'newcomer' of whatever age or other experience in amateur radio!

Anyway, let's all try to make 1990 a 'bumper' year for microwave activity and applications. WARC 1992 is rapidly approaching and unless we clearly demonstrate our use of the microwave bands, it will be increasingly difficult to justify their retention on as generous a basis as at present: the old adage of 'use or lose' has never been truer than now. It should be getting easier for almost anyone to exploit at least the lower bands, with the appearance of new, inexpensive devices aimed at the mass market. Devices such as GaAsFets, MMICS and the like, even if 'black boxes' are still an expensive rarity!

Newsletter

Issue 05/89 has recently dropped through the letterbox and, for the benefit of non-subscribers, here is a summary of what it contained.

First, two bits of news from the USA, one bad and one good. The bad news is that the ARRL have decided to discontinue the

microwave column in *QST*. Written by Bob Atkins, KA1GT (ex G8EKB), this has been an informative and lively column for several years, providing us with a window into American doings on the microwave bands: progress there has been quite phenomenal in the past ten years or so and it will be a sad loss indeed when this prolific source of information and ideas disappears. I hate to think of the consequences in the longer run when American amateurs have no outlet for their microwave news and views in their national society's journal and I guess we must count ourselves fortunate in the UK to have both this column and the Microwave Newsletter, warts and all, to keep us informed.

The second piece of news is that N6CA/6 and N6SNA/6 near Santa Barbara worked XE2GXQ/N6XQ near Guerrero Negro, Baja California, on 5.7GHz for a North American (and probably World) record of 986km. Prior to this, contact over the same path was also made on 3.4GHz. 1.3GHz was also tried but proved very marginal at +1 to +3dBm and the 2m talkback didn't work either. Talkback on 220MHz was no better and finally 28MHz — via Hawaii — was used!

Sam, G4DDK, contributed a very useful article on two versions of a 2.3GHz (actually 2556MHz) single stage amplifier using one of two alternative Avantek GaAs devices as a power booster for his 2.3GHz local oscillator source: he needed +20dBm to drive a diode-based multiplier to 10224MHz whilst his IO gave around +7dBm. Performance has proved to be close to design which was derived using RF-Designer (TM) with optimisation for 1.6mm glass-fibre board.

Sam also provided details of a new Avantek low-noise 'plastic' GaAsFet, the ATF13284 which retails at \$6.50 in 1 to 25 quantities. It is usable from 2 to 16GHz. When readily available in the UK, it is a likely candidate for amateur equipment designers.

A letter from GW4JJW asked for more information on beacons, Andy having complained of a lack of information on the subject. It prompts me to remind readers that a beacon list (both UK and EU) is kept on the HQ computer and printout of either list may be obtained on request. (I believe a nominal fee is payable to cover paper and postage, but enquire first, please, from the Membership Services Department). It will give call sign, nominal frequency, ERP, height of antenna, antenna details and modulation mode. What it will NOT give is details of short off-air periods but will give indication of

whether a particular beacon is temporarily non-operational or active.

Finally there were several pages of operating news, subscriber's ads, and an update of the 1989 operating ladder covering 3.4 to 24GHz. I'll publish the table here if it is of interest to readers of the column who don't see the Newsletter.

Circuit 1.3GHz receiver kits

I mentioned last month that Eastnet had had problems with the local oscillator drive level in this receiver. A little more detective work revealed that a couple of component specification changes had been made which had not been 'designer approved.' The original Schottky mixer diode had been replaced by an unsatisfactory substitute and the final multiplier transistor — a 2N3866 — had been replaced by a 2N3966 of a different make to that originally specified. I know from bitter experience in my early days of solidstate experimentation at 432MHz that not all 2N3866's are the same: indeed the output of the Microwave Committee 384MHz driver board depended to a great degree on the make of BFY90 transistors used and that this was the subject of much debate and experiment in the early days of that design. Hence my exhortations, earlier this year, to use only specified components for any microwave design! A satisfactory mixer diode and multiplier transistor have now been supplied and it seems that the problems have been fully resolved.

More awards

Ian, G4OUT, our Awards Manager has notified a few more awards, this time all for 1.3GHz, as follows:
10 Squares G4FVK (No. 65)
75 Squares G4BYV (1)
75 Squares G3XDY (2)
Note that the highest Square scores, numbers one and two are both resident in East Anglia: no coincidence, just that North Sea ducts enable penetration deep into Europe more often than from elsewhere in the country!

The German national society, DARC, Weinheim branch have introduced a new Europa — SHF — Diplom, for microwave operation, to celebrate its 30th anniversary. The aim is to stimulate microwave operation — where have I seen that problem before!

There are some interesting requirements which are designed to handicap well placed stations to improve the chances of those who 'have been imposed with a natural topographic handicap' ie. a poor location! QSOs made during IARU

Region 1 contests in October are not valid for the same reason and for the additional reason that DARC don't want the diploma gained as 'a by-product of only one big contest.' CW or SSB contacts are eligible, but may not be mixed, nor may bands be mixed. Operation is restricted to any nominated 180 degree semi-circle (you may choose to operate only in your 'best' direction) and band multipliers apply. Scoring is based on Locator squares and 100 points are required for the first stage, 200 for the second and so-on up to 500 for the top award. Full details were published in DUBUS 1/89 or are available from DARC-Ortsverband, Weinheim, D-6940 Weinheim, Weidsiedlung, attention the Diploma Manager (enclose prepaid envelope, ie IRC).

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With Christmas just around the corner, it is appropriate to wish readers a Merry Xmas and a Happy and DX-filled 1990. If the HF bands continue as they are at the time of compiling this, next year should indeed be the best for many years. My 'Spectrum Analysis' piece covers what SWLs had reported during October, and includes a great deal about the DX which had been heard on 28MHz.

January Challenge

Time once again to remind listeners of my January Challenge. This is a challenge I have run every January for the last few years aimed at getting SWLs on the lower frequency bands at the time when DX conditions invariably tend to be at their best because of the short days experienced here. Typically, sunrise is about 0800 and sunset about 1615. DX on the LF bands is therefore feasible from about 45 minutes after 0800 and 45 minutes prior to 1615. In past years, the Far East and Pacific have been audible on both 7 and 3.5MHz from around 1530, while at the other end of the day Caribbean and North American DX can be heard quite well on both bands until around 0845 — and sometimes the JAs appear long path on 7MHz at around 0900 when conditions are really good. Having whetted some appetites, let me return to the idea of the Challenge.

If we imagine that most SWLs spend much of their time logging DX on the HF bands, the Challenge is designed to tempt them off of those bands and on to the LF bands where 5-Band Heard DXCC totals are probably quite low. One advantage of a month-long challenge is that you are not tied to listening at a set time. You can therefore please yourself when you listen to tie in with work, household, or other commitments which might be more pressing. The aim of the Challenge is to see how many countries can be heard on 7, 3.5 and 1.8MHz. We abandon normal contest rules for the event, which hopefully will tempt some listeners who don't like contests as such to enter.

The rules are simple and are as follows —

1. The challenge will run from 0001 on 1 January to 2359 on 31 January 1990.
2. Only one station from each DXCC country can be claimed for points on each band.
3. Any mode may be used — SSB, CW, RTTY etc.
4. 5 points can be claimed for each country outside your own continent

on 7 and 3.5MHz. 1 point can be claimed for each country within your own continent on 7 and 3.5MHz. 1.8MHz scoring is 2 points for countries in your own continent and 10 points for those outside your continent (Note the changes from 1989).

5. Stations do not have to be in QSO, ie stations heard calling CQ and getting no replies will count for points.

6. The full callsign of all stations MUST be given. Reports must be honest and accurate. No report of less than 3x3 on SSB, or 339 on CW or RTTY should be claimed for points.

7. Logs should be sent to me at the address shown to be postmarked no later than 26 February 1990.

The scoring has been altered this year to take account of comments received with last year's logs. All that we need now are entries from those listeners who have not entered before, and good conditions so that some good scores can be claimed. Plaques will be awarded to the leading entrant from Britain and overseas.

The 1990 Tables

So far, the tables this year have been disappointing. The VHF one shows scores from the six stalwart listeners who report happenings on that part of the spectrum, but the HF one has been very poorly supported. I do not know why. I have thought long and hard about continuing with a table for next year, but several listeners I have spoken to feel that, properly supported, an HF table showing what listeners have heard through the year is a valuable part of the column. I have therefore decided to continue with it, but I hope that entries will definitely increase.

The rules are very simple, because the table is taken on trust. Simply keep your log in the usual way, but also keep a checklist of the different countries you hear on each of the bands. Countries lists are easy to obtain. The Society has one available which only costs 46p to members. To prove there are some active SWLs in the country, why not take part in the competition next year? To date, I have not provided any commemorative plaque for the winner, but if that is the stimulus YOU need to enter, I shall happily provide one for the 1990 table, if there are sufficient entries. Just look at this year's table to see the format, and ensure that I receive your figures by the deadline quoted each month.

Free QSL Cards

Steve, G4RAW, wrote to remind listeners that local companies might

be only too pleased to provide free QSL cards if they knew that they were going to get free worldwide publicity by doing so. Steve had managed to strike some good deals with his local Council, the local paper, a well known Building Society and an electronics firm. The Director of Tourism of Halifax Council even suggested that amateurs from around the world might be tempted, on receiving the card, to visit Halifax for their holidays!

Another idea is to use a view of your town as your card, just overprinting your BRS number. Steve sent me one of the cards donated by his local paper which showed Halifax circa 1911. Such 'Those were the days' cards seem to be quite popular at present. Apart from the ones sent by G4RAW, I am aware, through GOKPZ, that Bexley Council, here in London also have a series of prints available. These do cost a few pence, but if you are looking for something different, you need look no further. Remember also that the Society used a series of 'old' prints for its recent Fiftieth Anniversary. These were very popular too. If I have provided listeners with a fresh idea for QSL cards and if anyone is successful in obtaining some free cards, let me know.

News from Canada

Mike Parent BRS 88763/568 was a welcome newcomer to write this month. He sent logs for the Society's contest and supported the Cray Valley event too. He used to be the VE8RCS QSL Manager and in 1988, was the VE8RCS Club President. They operate with a special licence up at Alert as most of the operators do not hold their own licences. They are the back up communications team and it is not always possible to have a licensed amateur there for every tour of duty. Most of the operators are, however, hot stuff when it comes to reading morse — most can copy at 35wpm! Mike has promised to write further about activity at VE8RCS

which I will be glad to include here when it arrives.

Alternative Christmas Competition

I was talking during October to John, G3XWK. In the late 40's he was A1013. He showed me a photograph of his SWL shack in 1948 which I would really have liked to reproduce here, but alas, the quality was not too good. John explained that he was quite a successful listener in those days and had a goodly array of QSL cards to prove it. He used a Radiovision V55R receiver, which was a commercial modification of the R1155 covering only 3.5, 7, and 14MHz, and a Labgear preselector/converter which enabled coverage of 27MHz — then a band used by American amateurs — and 50-60MHz.

John felt that it would be interesting for me to set a competition based on the QSL cards on his SWL shack wall in 1948. Most were very exotic, many relating to countries which no longer exist, and all brought back fond memories for G3XWK. Here is a list of the cards. I will be pleased to hear from any reader — listener or licensed amateur — who knows some or all of the locations appropriate to the callsigns. Here goes — D2IH, AR8AB, MF2AA, CZ2AC, C8YR, EK1AD, FG3GP, FT4AI, FKS8AD, HE1EO, J9ABL, LI2BO, MD5AK, NY4ZQ and VS7IT. There you have 15 very exotic prefixes from 1948. I hope that somebody will take up the challenge and tell me the countries. There will be a prize for the best entry.

Finale

Because of the early deadline for this issue, and the fact that most letters were about the superb HF band conditions — see Spectrum Analysis — that is it for this month.

Please let me have any material, including photographs, news from newcomers, etc by 22 December 1989.

RSGB

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HILARY CLAYTONSMITH, G4JKS
115 Marshalswick Lane, St Albans,
Herts AL1 4UU

For a long while now, members have been asking for clarification of the Radio Investigation Service's policy in relation to complaints of interference from radio amateurs. During a recent meeting with the RIS it was agreed that an article on this matter, written by a member of the RIS would be beneficial at this time. The complete article follows.

The RIS and the Radio Amateur

"Alongside the steady growth in the popularity of amateur radio is a concurrent increase in the use of high-tech entertainment apparatus in the home. Combined with modern housing density, the potential for interference is therefore also increasing. Whilst in relation to the numbers of radio amateurs, problems are minimal, it is the case that when such problems do arise they are some of the most difficult and time consuming problems which the Department of Trade and Industry's Radio Investigation Service (RIS) has to resolve. They involve complaints of interference to domestic television and radio sets, and electrical apparatus from amateur radio.

"Domestic TV and radio reception problems are, of course, only one area of RIS investigation work. In view of the many other calls on the RIS for assistance, clear priorities have had to be adopted. Inevitably the service has to give first priority to dealing with interference which endangers the safety of life. The second priority is to deal with interference which could disrupt the running of business and services. After these priorities the RIS deals with all other radio interference problems. Most complaints involving amateur radio can, and are, solved by amateurs and their neighbours co-operating to resolve the problem together, provided there is goodwill on both sides. In some cases, where solutions are either not readily forthcoming or co-operation is not given, the problem can easily escalate leading to complex protracted disputes between neighbours.

"Many complaints of apparent interference are due to receiving apparatus having poor immunity to unwanted radio signals. The EC Directive on electromagnetic compatibility which will require manufacturers to conform with new standards, covers a wide range of electrical and electronic apparatus,

including new televisions, radios and other domestic entertainment equipment and will take effect from 1992. This should help considerably to solve the immunity problem.

"Often breakthrough problems can be alleviated or eliminated relatively easily by a change in transmission habits or aerial configuration. If reception problems can be cured by the provision of filters then many amateurs will supply these without charge on the grounds of good neighbourliness. Our aim in these cases is to get people to co-operate and to achieve this, our first action on receipt of a complaint, is to write to both the complainant and the amateur.

"We ask the amateur to take steps to try to resolve the problem (possibly with the assistance of another amateur or the RSGB) and at the same time we write to the complainant pointing out that many problems of apparent interference are due to poorly tuned or maintained sets, inadequate aerial arrangements or poor receiver immunity. We enclose a copy of the RIS booklet 'How to Improve Television and Radio Reception' and explain that we can visit them to carry out a detailed investigation of their reception arrangements and try to resolve problems on payment of the standard charge of £21 for this service, providing the set is connected to an external aerial and providing a dealer or aerial contractor has examined the set and has not been able to resolve the problem.

"After 28 days, if the amateur has not been able to resolve the problem or is unwilling to assist, we carry out a station inspection to ensure that the apparatus is being used in accordance with the terms and conditions of the licence. If necessary we undertake transmitter field strength test measurements to check that the CENELEC limits, within which televisions and radios should be immune from outside signals are not being exceeded. If the strength of amateur transmissions exceeds that which properly protected radio and television sets can cope with, we expect the amateur either to modify transmission practices and/or reduce power.

"If the amateur station is in order it is up to the complainant to ensure that the receiving arrangements are satisfactory and that the reception apparatus is checked to see whether the immunity could be improved. If the complainant wishes to pay for an RIS investigation, the RIS would write to manufacturers informing them of the problem and asking them to assist.

"There is a balance to be made in

these cases and we have already referred to the need for co-operation between amateurs and their neighbour. Unfortunately some cases can become almost impossible to resolve due to extremely bad neighbour disputes. Positions become entrenched with neither side being prepared to listen to the other. Amateur radio is often only part of an overall dispute but can act as the catalyst to a complete breakdown with the neighbour being satisfied with nothing less than the complete shutdown of the amateur, who in turn may become totally uncooperative.

"Amateurs can do much to ensure that relations do not become strained by consulting with their neighbours at an early stage. When first moving into an area or when first taking up amateur radio it is sensible to explain to neighbours what is proposed, particularly as regards aerial installations, and allay any concerns neighbours may have about interference.

"Aerials and masts are a particular source of complaint on grounds of unsightliness. Many people also consider that large aerial arrays are detrimental to the value of property in the area. This is an aspect to which some amateurs need to be more sensitive. Is a large aerial installation really necessary? If it is, speak to the neighbours about it first. The mere fact of having consulted the neighbours in advance makes it less likely to cause grievance than if neighbours are suddenly and unexpectedly confronted by a massive aerial array.

"Amateurs must accept that the benefits of amateur radio are not necessarily going to be shared by their neighbours, but a little friendliness and diplomacy will go a long way in helping its acceptance in the neighbourhood."

If you have any comments to make on the above, please send your letters to me at the column and NOT to the RIS.

Launch of the EMC Co-ordinators Scheme

The EMC co-ordinators scheme was launched at the HF Convention on October 1st. The aim of the scheme is to provide a network of people out 'in the field' who can be contacted for advice by members experiencing EMC problems.

There are seven EMC Committee members, sixteen corresponding members and fourteen co-ordinators at present in the scheme. Although this may seem a vast number of RSGB EMC personnel there are as you will see, gaps. Hopefully as time goes by and

Calling solicitors

If you are an active radio amateur and a practising solicitor and coincidentally interested in the problems surrounding our hobby in relation to EMC, please contact me at the above address.

people realise the task of being a co-ordinator is not too onerous the numbers will grow.

We have at the present time no co-ordinator for Zone B. If you live in Nottinghamshire, Leicestershire, South Humberside, Lincolnshire, Derbyshire, Northamptonshire, Bedfordshire, Warwickshire or West Midlands and would like to become a co-ordinator, get in touch with the Helpline 0329 239644.

It is intended that the first point of contact will be with the co-ordinators, who, if they are unable to help, pass the information upwards to the corresponding member and ultimately to the EMC Committee, only after all other avenues have been exhausted. This will leave the Committee members free to deal with the high-level cases which are currently under investigation by the RIS or through MPs and at ministerial level. These cases usually involve a considerable amount of time being spent in trying to mediate between neighbours, local councils and the RIS. At any one time there may be between two and four cases being processed.

Because EMC cases are not going to diminish it is suggested that each Radio Club appoint an experienced person from within its membership to help with EMC matters in the Club. Secretaries might think of putting this on the Agenda for the next meeting. This would then form an ideal fourth layer to the overall scheme.

The increasing use of electronics in the home is going to increase the risk of problems arising. Unless we, the Amateur Community, take the lead in good relations with our neighbours, then our service will come under severe threat.

Please use this new facility the RSGB has set up for your benefit, but remember we are only volunteers. Names and contact numbers can be found in the news pages of this month's *Radio Communication*.

Teleswitches

Following queries by members, the committee is looking into certain problems arising from the use of these radio switches which switch the electricity meter to supply cheap rate electricity during the night.

IN PRACTICE

We've had another nice postbag since last month, for which many thanks, and no less than eight people wrote in to draw our attention to some of the more intriguing fantasies currently doing the rounds of the hi-fi world about the audible effects of different types of cable. Back to this shortly, but let's begin with some more of your questions.

IP ratings

'I recently bought a masthead preamp for 430MHz and in the literature it said that it was "protected to IP65". I was intrigued by this since not long ago I purchased an outside lamp for my house from the local DIY emporium and on the box it said "Protected to IP44". I've never heard of these strange IP numbers - can you please tell me what they mean?' C B, Crawley

No two sources seem to agree on what the letters 'IP' stand for, but the IP rating system exists to provide a means of classifying the degrees of protection from dust, water and impact which are afforded to a particular item of electrical equipment. The system is recognised in many European countries and is formally set out in British Standards 5420 and 5490.

The first number defines the equipment's protection against solid objects; the definitions are as follows:

- 0 - no protection
- 1 - protected against solid objects up to 50mm, eg accidental touch by hands
- 2 - protected against solid objects up to 12mm, eg fingers
- 3 - protected against solid objects over 2.5mm, eg tools and wires
- 4 - protected against solid objects over 1mm, eg tools, wire and small wires
- 5 - protected against dust - limited ingress permitted
- 6 - totally protected against dust

The second number defines protection against liquids, as follows:

- 0 - no protection
- 1 - protected against vertically falling drops of water, eg condensation
- 2 - protected against direct sprays of water up to 15° from the vertical
- 3 - protected against direct sprays of water up to 60° from the vertical
- 4 - protected against water sprayed from all directions - limited ingress permitted
- 5 - protected against low-pressure jets of water from all directions - limited ingress permitted
- 6 - protected against low jets of water, eg for use on ship decks - limited ingress permitted
- 7 - protected against the effects of immersion between 15cm and 1m

8 - protected against long periods of immersion under pressure

Most IP codes we've come across on UK-made equipment only use two digits - as in the examples of 'IP65' and 'IP44' cited in C B's letter. However, although it isn't specified in the British Standards, a third number defining protection against mechanical impacts is used in the corresponding international standard; for the sake of completeness, here are the definitions for it:

- 0 - no protection
- 1 - protected against impact of 0.225 joule (eg 150gm weight falling from height of 15cm)
- 2 - protected against impact of 0.375 joule (eg 250g weight falling from height of 15cm)
- 3 - protected against impact of 0.5 joule (eg 250g weight falling from height of 20cm)
- 5 - protected against impact of 2.0 joule (eg 500g weight falling from height of 40cm)
- 7 - protected against impact of 6.0 joule (eg 1.5kg weight falling from height of 40cm)
- 9 - protected against impact of 20.0 joule (eg 5kg weight falling from height of 40cm)

So, to sum up, a masthead preamplifier protected to 'IP65' is totally protected against dust and also protected against low-pressure jets of water from all directions, although 'limited ingress' of water is permitted. If it was protected to 'IP655' you could drop a 500g weight on it from a height of 40cm and expect it to survive. It's useful to know how to interpret the IP system, if only to have a good laugh at advertisements such as one we saw recently in a professional journal where a PMR antenna combiner was proudly billed as being 'totally rugged and dependable... protected to the demanding international IP200 standard' Should have a life of several minutes on a calm summer's day...

Identifying battery types

'I know this is a very trivial query, but please help if you can. I get very confused about batteries - not so much the differences between the various types such as alkaline and zinc-carbon and so on but sizes and shapes of the common ones. There seems to be some new-fangled IEC coding which bears no resemblance to the various types of cans, and I recently wasted a few pounds on buying batteries for a Datong speech processor only to find when I got home that they were the wrong ones. Is there a foolproof way of identifying batteries, or do you need a degree before you go into the chemists these days?' R E, Rochester

Having recently been sent into town by the XYL with a brief to get some new batteries for the household torch and having arrived home with the wrong ones, I know the feeling. What happens is that popular 1.5 and 9V batteries are given a size code (ie AA, D, etc) and also an 'IEC' reference

(the letters standing for International Electrotechnical Commission), and one or other usually appears on most batteries you find in the shops. Some of the larger manufacturers use a modified version of the IEC coding for their own product reference as well. For example, the Datong ASP speech compressor uses an 'AA' size battery for which the IEC code is 'R6'. If we look at Ever Ready's products in this size, their alkaline version is an 'LR6' and their 'Blue Seal' and 'Silver Seal' variants are 'R6B' and 'R6S' respectively.

In case that's more confusing than helpful, we've reproduced the diagram below by courtesy of Farnell Electronic Components.

To avoid those embarrassing moments when you can't remember whether it's an 'AAA' or 'AA' size you need, we've also reproduced overleaf a battery gauge chart from the Farnell catalogue.

Armed with both of these you should be able to cope with most of the domestic-type batteries you come across, although there are inevitably a few oddballs like the 'half AA' and the 'F' which are occasionally found in older equipments and which we haven't mentioned here.

Actually, this question brings out a point well worth bearing in mind. The catalogues of suppliers such as Farnell, RS Components and Maplin are a truly wonderful source of data about electronic components of all sorts - especially about things like coding and sizes. If you're trying to find out something about a particular component and all your other sources have failed, try looking in a supplier's catalogue and you may be pleasantly surprised.

Logic families

'I'm just getting interested in using CMOS and TTL logic for various home-brew applications, but I must say I find the profusion of different families (AC, ACT, BCT, FAST, etc) extremely confusing. Can you tell me what the differences between them are and whether or not they matter? Also, can you recommend an up-to-date book on electronics which gives me some background?' R C, Derby

Quite the best book we've come across recently is *The Art of Electronics* by Paul Horowitz and Winfield Hill. The first edition of this appeared in 1980 and is probably the most well-thumbed textbook on our shelf; the second edition appeared earlier this year and is even better. It's published by the Cambridge University Press, and we understand that a paperback edition is likely to be available by the time you read this. It's one of the few electronic textbooks we've seen which has the air of having been written by people who spend their lives with a soldering iron in one hand and a data sheet in the other - real engineers, in other words. And it's so well-written that you can't help

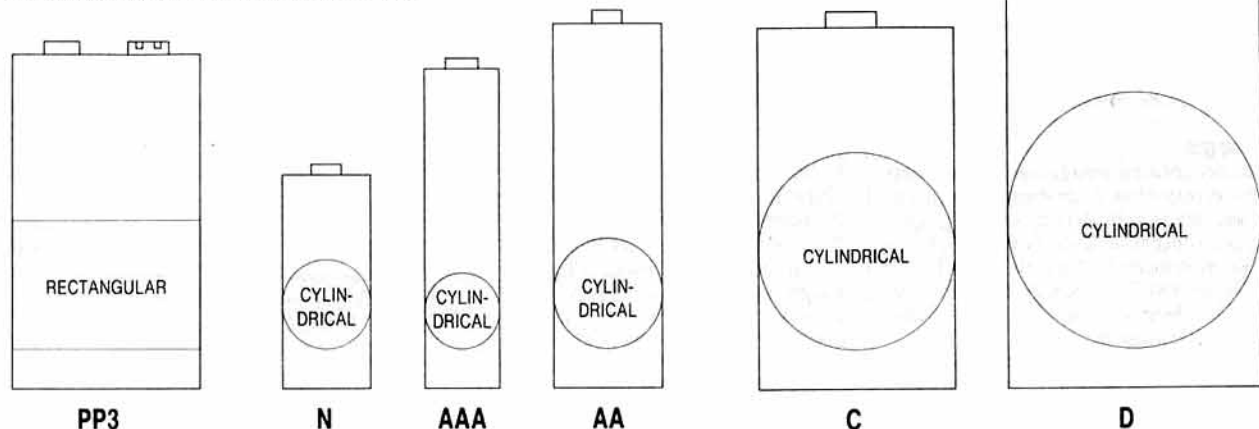
POPULAR BATTERY SELECTION CHART			ALKALINE		LITHIUM	NI-CAD	ZINC CARBON EVERREADY		
Voltage	IEC No.	Can Style	DURACELL Order Code	EVERREADY Order Code	KODAK Order Code	EVERREADY Order Code	'Blue Seal' Order Code	'Silver Seal' Order Code	Other Order Code
1.5	LR03	AAA	MN2400	LR03	—	NC18*	—	R03S	—
1.5	LR6	AA	MN1500	LR6	—	AN50HB*	R6B	R6S	—
1.5	LR14	C	MN1400	LR16	—	AN220HB*	R14B	R14S	—
1.5	LR20	D	MN1300	LR20	—	AN400HB*	R20B	R20S	—
9	6LA61	PP3	MN1604	6LF22	U9VL	SB1166*	PP3B	PP3S	—
9	—	PP9	—	—	—	AB446X*	—	—	PP9

*1.2V version *8.4V version

BATTERY GAUGE CHART

Note: Drawings below are only approximate as dimensions do vary from manufacturer to manufacturer.

Reproduced by courtesy of Farnell Electronic Components.



stopping to read about something that catches your eye whilst you're supposed to be finding out about something completely different. Very reader-friendly, and definitely worth dropping a QRO hint to Santa about. Another good one is *A Practical Introduction to Electronic Circuits* by Martin Hartley Jones, which is also published by the Cambridge University Press. Someone mentioned to me on the air the other day that there's now a second edition of this book too, although I haven't seen it. However, the paperback first edition which I bought some years ago is also pretty dog-eared; the treatment of transistors in particular is very easy to get on with but there's lots of other excellent material in there too.

Coming on to the nomenclature of the various logic families, the first integrated-circuit logic family was 'resistor-transistor logic' (RTL) which was introduced by Fairchild in 1961. RTL was fairly awful and it was quickly displaced - firstly by Signetics' DTL (diode-transistor logic) in 1965 and then Sylvania's so-called 'Universal High Speed Logic' (SUHL). Since this latter relied solely on transistors to form the logic elements, it soon became known as transistor-transistor logic or TTL - and by the early 1970s it had become virtually an industry standard. Texas Instruments introduced a numbering scheme of the form '74xx' for their version of it, and before long most other manufacturers had adopted the same numbering system; later on '54xx'-series TTL became available to meet a military requirement for operation at higher and lower temperatures than 74xx TTL could cope with.

The next development was the '74Hxx' TTL family, in which the 'H' stood for 'High Speed'. This delivered twice the switching speed of standard 74-series but - since it achieved this feat by halving all the resistor values inside the chip - the power consumption also doubled, which meant that some 74H devices were real horrors to use. At about the same time, Texas developed a low-power TTL family, the '74Lxx' series, which could only run at about 25% of the speed of standard 74xx TTL but which only took about 10% of the power.

Whilst all this was going on, RCA was busy developing a completely different logic family based on MOSFET technology. What we now know and love as 'CMOS' (which stands for

Complementary Metal-Oxide Semiconductor) became commercially available in 1971, and was immediately popular because it had zero quiescent power consumption and was tolerant of a supply anywhere between about +3 and +12V - unlike the strict +5V demanded by the various TTL families. However, CMOS was much slower than TTL and was also exceedingly sensitive to damage from static. It still is - we'll discuss that some time in these columns if you like. The various ICs available were given four-digit numbers beginning with 4, and so-called '4000'-series CMOS is still very much with us today.

So the position by the early 1970s was that there were two main logic families - TTL and CMOS - and before long various improvements and enhancements were being made to both. In TTL, Schottky clamping diodes between base and collector of the output devices kept them out of saturation and speeded them up by approximately a factor of three; these were incorporated in the '74S' family. This was quickly followed by the '74LS' ('Low-power Schottky') series, which was even faster than standard TTL but required less than a quarter of the power. The next enhancement came with Fairchild's introduction of what it called 'FAST' ('Fairchild Advanced Schottky TTL'), which was even faster than Schottky TTL and required about a third of the power; these devices are still current and are numbered in the 74F series. Texas Instruments then produced the '74AS' and '74ALS' ranges ('Advanced Schottky' and 'Advanced Low-power Schottky' respectively), which were comparable to the Fairchild devices.

Whilst this was happening, the original CMOS '4000' series had evolved into the '4000B' family, with many improvements. Some of the original 4000-series devices had extremely awkward characteristics and were almost impossible to use. It isn't widely known, for example, that the original 4009 and 4010 inverters would self-destruct if the supplies were turned on in the wrong sequence and that the 4030 was almost impossible to use in pulse circuitry. The 4000B series has much better input protection, amongst other things. Shortly after the 4000B family made its appearance, Texas Instruments introduced another CMOS family, the '74C' series. As you might expect, these had the same functions as the corresponding TTL devices - the 74C32 and the 7432 are both quad

two-input NOR gates, for example. In the early 1980s the original 74C devices were developed into the '74HC' and '74AC' ('High-speed CMOS' and 'Advanced CMOS') respectively, which for the first time introduced CMOS which was almost as fast as TTL but which had the advantage of drawing zero quiescent current. What seems to be happening in industry is that this high-speed CMOS is taking over more and more applications which previously were the domain of TTL, although it is not directly compatible with NMOS logic such as that found in microprocessors because the latter's logic HIGH output is not high enough to drive the input of HC and AC-series CMOS. For this reason the '74HCT' and '74ACT' CMOS families were introduced in 1981; these have TTL-like threshold voltages and can be tied directly to NMOS (or even TTLK) ICs. Incidentally, the '74CBT' group mentioned in R.C.'s letter is a series of octal buffers and line drivers introduced recently by Texas Instruments; these are somewhat outside the run of what we've been describing.

We hope that helps; modern logic is certainly very easy to design with and use, and you're much less likely to blow it up by looking at it than you were a few years ago!

Want a balun?

Would you believe that you can make a high-performance ferrite balun for the HF bands in half-an-hour flat and still have change out of 50p? Read on.

As explained in the article by G3SEK (December 1989), and in G6XN's book *HF Antennas for All Locations*, the function of a balun is to 'convert' between an unbalanced coaxial feeder and a balanced load. The load can be either an antenna - such as a dipole - or twin feeder. If the load is resonant, baluns can also be made to transform impedance, but they become very inefficient with mismatched loads.

A 1:1 balun doesn't transform impedance, but a 4:1 balun is often used to convert from 75 ohm unbalanced feeder to a 300 ohm balanced load like a folded dipole. The 1:1 balun has three windings, and the 4:1 has only two. Incidentally, the correct type of balun for a G5RV is the 1:1 version, even though it is connected at the bottom of a length of 300 ohm ribbon or open-wire feeder.

Here's how to make a three-wire 1:1 balun. It's very simple, and the two-wire 4:1 balun is easier still. First catch your ferrite, as Mrs Beeton would say. You don't need an expensive toroid - according to G6XN, a ferrite rod is better - but you do need an HF grade of ferrite. On both counts, the ferrite rod from a scrap transistor portable is ideal - it's free, and it's guaranteed to be OK for HF use. The usual half-inch diameter rod will easily carry full legal power into a reasonably well-matched load.

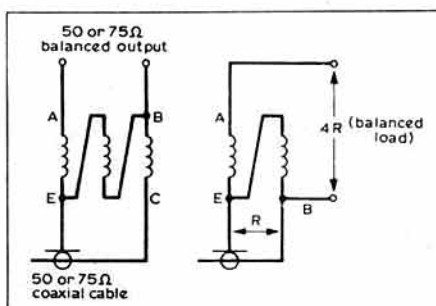
One rod will make two baluns if you break it in half - which is where life becomes interesting. Ferrite is like glass; it's too hard to saw, and it shatters unless you break it the right way. The trick is to file a sharp V-notch where you want the rod to break; then grip the rod in both hands with your thumbs on the opposite side from the notch and snap the rod in two. You can do the same by gripping one end of the rod between padded vice jaws, and hitting the other end with a padded hammer on the same side as the notch. With a bit of luck, you'll have two good pieces of rod; with slightly less luck, you'll still salvage one piece out of the fragments.

Next, cut three lengths of 18-20 swg enamelled copper wire. The enamel needs to be of the variety which is tough and difficult to scrape off. Straighten and hard-draw each length by gripping one end in the vice and yanking hard. Lay the three straight wires together in a triangular bundle with no twists, and apply a spiral wrapping of PTFE plumber's tape. Wrap the wires firmly, but not too tight. Then wind 6-8 turns of the three-wire bundle tightly onto the ferrite rod, leaving NO GAPS between turns - do this slowly and with great care. The exact number of turns is not critical, though you'd want a few more to cover 1.8MHz. If you got the tension of the PTFE tape right, you will find that the bundle of wires lays itself down flat on the rod. If the wires don't want to lay down, squeeze the coil gently between soft and smooth vice jaws which won't scratch the enamel or smash the ferrite.

Having wound the required number of turns, carefully scrape off the enamel and connect the balun as shown, with the shortest possible leads. Connect coax to the unbalanced side and a low-power 50 ohm dummy load to the balanced side (four 220 ohm 0.5W carbon or metal-film resistors in parallel will do nicely). Check the VSWR, which should be very low; if not, check your wiring! You can also make other tests as suggested by G6XN and G3SEK. Once you are satisfied that all is well, fix the windings with epoxy glue or clear Bostik. Final weather-proofing and mechanical strain relief are up to you. Dead easy, eh?

Cables and things

I know that this isn't a hi-fi magazine and we shouldn't dwell on the subject for too long, but it's intriguing that quite a number of readers have written in as a result of the odd reference I've made to the weird and decidedly wonderful world of domestic sound reproduction. It's certainly true that the technical contents of some of the magazines aimed at the hi-fi market could be best described as very weird indeed, and the level of pure bull in most of them seems to be inversely proportional to the amount of technical knowledge possessed by the editor and his colleagues. One of the ideas which is currently exercising the minds of the audio fraternity is that the precise nature of the cable used to connect the various bits of the hi-fi together - the CD player to the



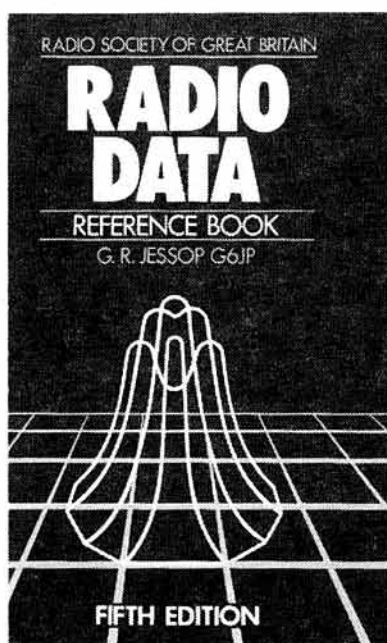
Wiring details for a 1:1 balun (left) and a 4:1 version.

amplifier, and the amplifier to the speakers, for instance - has a more or less profound effect on the quality of reproduction. Some wonderfully fancy adjectives are deployed by reviewers to describe this phenomenon, and some fairly shattering prices are asked for the fanciest cables. Several readers sent in examples of both phenomena, for which thanks very much - it only took us an hour to stop laughing and get back to work!

There seems to be little doubt that most of the observable differences are down to boring old L, C and R; it doesn't seem necessary to invoke an almighty mishmash of quantum physics, pseudo-science and ill-digested mysticism to explain the minor differences in quality which you can undoubtedly sometimes hear when you swap one sort of cable for another in a hi-fi system. Which type is 'best' is of course highly subjective since it depends totally on your individual interpretation of what reproduced music should sound like; it's probably also a function of how much you paid for the equipment, since no-one wants to feel that something they just paid £100 for sounds worse than something which they could have bought for £10. Equally, I've known a large number of hi-fi enthusiasts who've spent a fortune on equipment but who've never been to a live concert of music in their lives - so what standards are they judging the highness of their fi by?

Leaving aside the fact that the average hi-fi reviewer has about as much technical insight and background as the average barn owl - and that hi-fi magazines seem to be in more or less elaborate collusion with manufacturers - there's a moral to be drawn here. Do we sometimes prefer to believe that our amateur equipment must be good just because it cost quite a lot? Isn't this one of the main difficulties with trying to solve EMC problems - that your neighbour assumes that because he's spent £500 on his TV, or £5,000 on his hi-fi, that any RF breakthrough into it has to be your fault? On the same basis, it's terribly easy to assume that if you've just bought a £2,000 transceiver, any complaints from the locals about wide transmissions must be down to their receiver. There's an intriguing bit of human psychology at work here, which might be summed up as the "I paid good money for it, so it must be good" syndrome. As radio amateurs, whose technical knowledge is hopefully a cut above that of hi-fi enthusiasts, we need to make sure that we don't fall prey to fancy gadgetry and half-truths.

That's about all we have space for, except that we owe Mr Roger Barker, G4IDE, a profound apology. In our recent piece about safe operating area in bipolar transistors, we mentioned a circuit designed by him and published on page 37 of the July 1989 edition of *Radio Communication*; we said that we didn't think the BU208A used in it would be very reliable in the long term because its working point was outside its DC safe operating area. This was complete garbage; despite having used SOAR curves about a million times in the past few years, I managed to misread the Ic axis of the SOAR graph in a fairly big way and put the working point of the BU208A in a nonsensical place. We all make mistakes, but it's not right to criticize someone's creative work when you haven't done your own homework properly and I should have been more careful - apologies to Mr Barker for being silly and apologies to readers for writing misleading things. I shall probably be fired next month, so it was nice knowing you. □



RADIO DATA REFERENCE BOOK

Both the specialist 'home-brew' experimenter and general operator will find this publication of value, covering all aspects relating to the hobby. Radio Data Reference Book' can be obtained from RSGB HQ.

Available to RSGB members for
£8.95 (non members £9.59)

Announcing another new publication from the RSGB!

Microwave Handbook

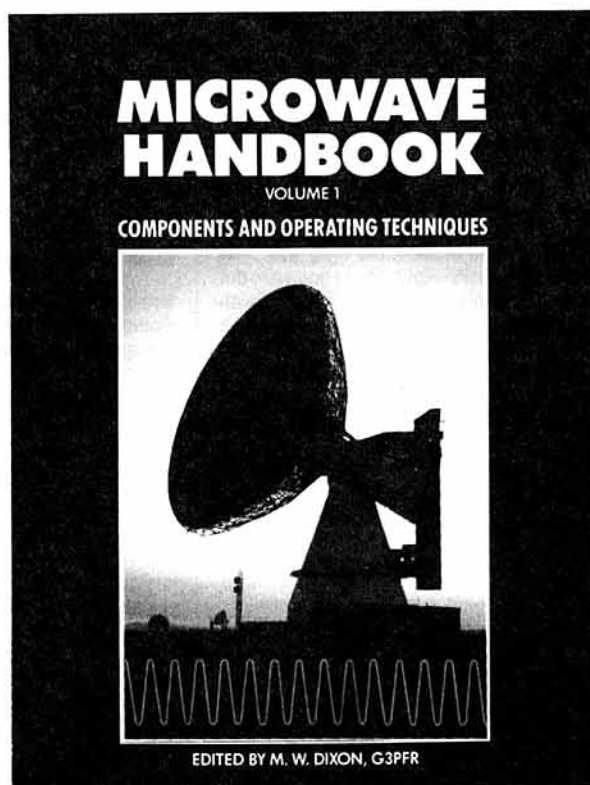
Edited by M. W. Dixon, G3PFR

In the last few years there has been an almost explosive growth in amateur microwave techniques, designs and devices available, leading to increased band occupancy and to some quite startling practical results. As a consequence, the need for an authoritative yet accessible source book for the growing numbers of enthusiasts involved has never been greater.

The *Microwave Handbook* meets this need, and more. It contains a largely non-mathematical review of microwave theory and practice applicable to the amateur bands, including much reference information. But it is also a timely collection of practical designs, hints and tips that have evolved from the advances recently made.

The *Microwave Handbook* will be published in three volumes. The chapter titles in this first volume are:
Introduction - Operating techniques - System analysis and propagation - Microwave antennas - Transmission lines and components - Microwave semiconductors and valves..

See this month's mail order list for details — pages 46-47



An invaluable addition to the keen amateur's bookshelf — of course, especially useful to the microwave enthusiast.

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BNOS L144-25-180 2mts 25W in 180W out.
BNOS LP 144-3-50 2mts 3W in 50W out.
BNOS LP 144-10-5 2mts 10W in 50W out.
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BNOS 70cms Full range available.
BNOS LP50-3-50 6mts 3W in 50W out.
BNOS LP50-10-50 6mts 10W in 50W out.
BNOS LPM50-10-100 6mts 10W in 100W out.
BNOS LPM70-10-100 4mts 10W in 100W out.

ANTENNA ROTATORS

AR 200XL Offset head, 3 wire rotary dial.
SU 2000 Bell type rotary dial.
G-250 Kenpro Bell type twist and switch control.
AR40 CDE Bell type turn and push control.
RC5-1 Create Bell type rmd meter 360 deg.
G600RC Kenpro Bell type rmd meter 360 deg.
HAM 4 CDE Bell type meter read out.
G800SDX Kenpro Bell type 450 deg varispeed.
G400 Kenpro Bell type Mtr control +/- 180 degs.
KR500 Kenpro elevation meter read out.
KR5400 Kenpro azimuth and elevation dual control.
CD562 Support Bearing CDE type.
AH200AB Alignment Bearing.

POWER SUPPLY UNITS

Complete Range of BNOS both series A and E 12 Volt from 6 amp to 25 amp in series A.
Series E 5/10E to 30E.
Series E 12/5E to 12/30E.
Series E 24/5E to 24/15E.
YAESU FP 757 HD 20 amp.
YAESU ICPS 15 20 amp.
YAESU ICPS 30 25 amp cont.
YAESU ICPS 50 25 amp cont.
YAESU ICPS 55 20 amp.
YAESU ICPS 60 General use 30 amp.
DRAE 12v/4 amp
DRAE 12v/12 amp
DRAE 12v/24 amp

MORSE KEYS

HK 702 Manual with marble base.
HK 704 Manual std base.
HK 705 Manual std base.
HK 707 Small manual std base.
HK 802/3 Manual solid brass.
MK 702 Single lever heavy base.
MK 703 Twin paddle without base.
MK 704 Twin paddle without base.
MK 705 Twin paddle with marble base.

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IC 781



IC 735

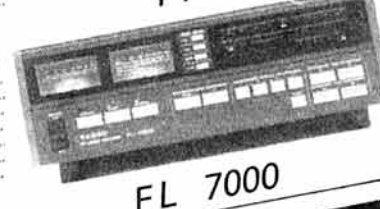


IC 765

YAESU



FT 757



FL 7000

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DUAL BAND TRANSCEIVERS

ICOM IC 32E 2/70 3.5 W.
ICOM IC 3210E 2/70 Mobile 25W.
ICOM IC 2400E 70/23cm Mobile 25W.
ICOM IC 2500E 70/23cm Mobile 25W.
YAESU FT 470 2/70 Mobile 50W dual display.
YAESU FT 4700 Mobile 50W dual display.
YAESU FT 736R Multimode case c/w 2mts 70cms.

RECEIVERS HF/VHF/UHF

YAESU FRG 8800 Gen coverage 150kHz-30MHz Large display, keyboard entry/free tuning.
YAESU FRG 9600 All mode up to 950MHz, 100Mems.
ICOM IC R9000 100kHz-2GHz CRT display 1000 Mems.
ICOM IC R7000 25MHz-1000MHz plus 1025MHz-2000MHz 99 Mems.
ICOM IC R7000 25MHz-1000MHz & 800-1300MHz.
AOR 2002 Scanner VHF/UHF 25MHz-550MHz & 800-1300MHz.
Full range of Air Band scanners.
AOR 3000 Available soon - All mode 100kHz-2036MHz 400 mems.
AOR 900 Hand held scanner 6 ranges up to 959MHz 100mems.

TRANSCEIVERS HF

ICOM IC 781 All mode gen.cov.RX. 99 mems 150W. inc crt display. ATU and PSU.
ICOM IC 765 All mode gen.cov.RX 32 mems 100W. inc internal ATU and PSU.
ICOM IC 751A All mode gen.cov.RX 12 mems 100W.
ICOM IC 735 All mode compact, gen.cov.RX 12 mems 100W.
ICOM IC 735 All mode compact, gen.cov.RX 12 mems 100W.
YAESU FT 767 GX All mode gen.cov.RX. All mode 100W.
YAESU FT 757 MK2 TCVR gen.cov.RX. All mode 100W.
YAESU FT 747 Compact TCVR 100W all mode.

VHF TRANSCEIVERS

YAESU MINI Hand held TCVR multi ch 10 mems to 5W.
YAESU FT 411 VHF TCVR 1-5W H/held.
YAESU FT 212RH 2M mobile FM 45W.
YAESU FT 290R 2 Multimode portable TCVR 2.5W.
YAESU FT 290R 2 Multimode portable TCVR 2.5W.
ICOM IC 25E FM handheld 3-7W.
ICOM IC 26E FM handheld 10 mems 1.5W.
ICOM IC 27E FM handheld Thumbwheel freq. entry.
ICOM IC 28E FM handheld multi coloured LCD 25W.
ICOM IC 228E FM Mobile multi coloured LCD 45W.
ICOM IC 228H FM Mobile multimode base station c/w int PSU.
ICOM IC 275E 25W multimode base station, Regs ext PSU.
ICOM IC 275H 100 Multimode base station, Regs ext PSU.

TRANSCEIVERS UHF

ICOM IC 4GE FM handheld 3-5W.
ICOM IC 4GE FM handheld 10 mems, LCD 1.5W.
ICOM Micro 4 FM Mini handheld 10 mems, LCD 1.5W.
ICOM IC 448E 25W FM mobile with 21 mems.
ICOM IC 475E Multimode base station c/w psu 25W.
ICOM IC 475H 74W base station requires ext psu.
ICOM IC 120E 10W FM 23cm mobile 21 mems.
ICOM IC 120E 10W FM 23cm mobile 21 mems.
ICOM IC 120E 10W FM 23cm mobile 21 mems.
ICOM IC 1275 23cm multimode base station c/w psu 10W.
YAESU FT 712 35W mobile transceiver FM.
YAESU FT 712 35W mobile transceiver FM.
YAESU FT 73R 70cms FM TCVR up to 5W. handheld.
YAESU FT 790R 70cms portable TCVR multimode 2.5W.

ANTENNA COUPLERS

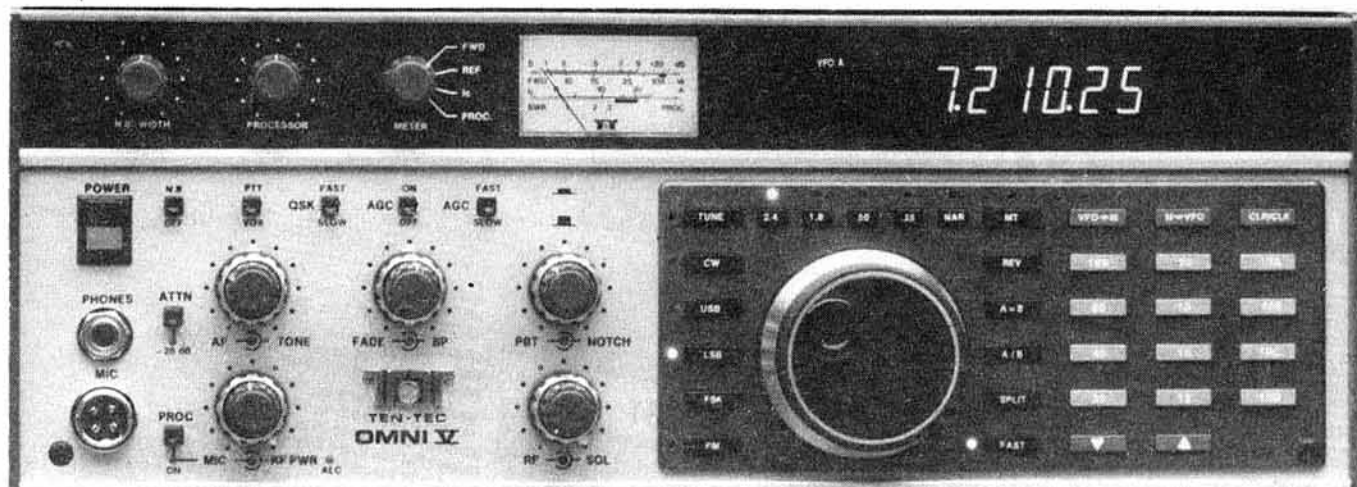
YAESU FRT 7000 Receiver coupler.
YAESU FC 757 GX Auto coupler.
ICOM AT 100 HF Ant coupler 100W.
ICOM AT 500 HF Ant coupler 500W.
AMTECH 9000 HF (all feeders) 100W.
CAPCO RANGE
MFJ RANGE
TOKYO HP RANGE.

DATONG SPECIALS

AD 270 Active dipole RX antenna for indoor use.
AD 370 Active dipole for outdoor use.
PC1 Gen.cov. converter. Adds full HF coverage to any 2M RX.
FL3 Audio filter c/w auto notch filter.
ANF Automatic notch and cw filter.
D70 Audio Morse tutor. Variable speed and spacing.
ASP Speech processor (RF) Specify transceiver Pse.

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YAESU FL 7000 All band amp, solid state c/w fully automatic ant. coupling.
ICOM IC 2 KL AMP for Auto Band Switching.
ICOM IC 2 KLPS AC power supply.
ICOM IC EX 627 Auto Ant Selector.
AMP RANGE ALL 3-500.



The NEW OMNI V:

The OMNI V is a Paragon with a 12 band crystal mixed local oscillator in place of the general coverage synthesized oscillator. The result is receiver cleanliness like the legendary Corsair and Omni series. The OMNI V local oscillator is a new ultra low noise 5.0 to 5.5 MHz PLL design. Phase noise is simply eliminated as a significant variable. Dynamic range is maintained right up to the edges of the crystal filters, even under the most adverse conditions.

Many of the nifty features made possible by digital technology are included. Dual VFO's with A-B-split select, the frequency stability of a PLL, 25 tuneable memories, VFO to MEM, MEM to VFO and the SCRATCHPAD feature. RS-232 interface is standard and includes remote band switching for the HERCULES II amplifier. The memories are nonvolatile RAM and are retained until you change them. The status registers and clock are backed with a lithium battery (2 year life) so that when the rig is powered up, the status is the same as when you turned it off.

The OMNI V operates USB, LSB, fast or slow QSK CW and real FSK. FM is optional. All bands from 160 through 10 meters are push button selectable. Each band position covers 500 kHz plus 30 kHz over-shoot at the band edges. The four 500 kHz segments of the 10 meter band are switched automatically as you tune through the segment limits. Tuning is in your choice of 10 Hz or 50 Hz increments on SSB, CW and FSK. With the FM option, tuning is in 100 Hz or 500 Hz

increments. Up/Down buttons tune in 10 kHz or 50 kHz increments.

An auxiliary frequency tuning system is available and plugs into the rear panel. This allows you to remotely tune the frequency from the most convenient and comfortable position. It takes about 10 ms to fall in love with this option.

A noise blanker and audio speech processor are standard equipment as is the cw sidetone and speech monitor. The rear panel has a full complement of inputs, outputs and controls for the convenience of the all-mode operator, including an auxiliary RX antenna input. High speed key lines are provided for QSK control of a fast switching amplifier, such as the TITAN or HERCULES II. Changeover in fast QSK is less than 30 ms, great for CW and the digital modes.

The front panel is spacious and friendly. The vacuum fluorescent display uses large, bright, easy to read elements. The frequency display doubles as the 24 hour clock display when the CLOCK button is pressed. Other elements indicate VFO status and warn when the memories are full.

All four of the 6.3 MHz I-F crystal filter positions are push-button selectable, independent of mode. A second filter socket is also provided, in series, behind the standard 2.4 kHz filter in the 9 MHz I-F. This may be used for an optional 2.4 kHz, 1.8 kHz, 500 Hz or 250 Hz filter which is selected with the "NARROW" button. This adds six or eight poles into the crystal filter network and

even further reduces the impact of adjacent strong signals. Most impressive!

If you do not need a general coverage receiver in your HF rig, the elegant OMNI V is a great choice. If you are also a serious DX'er and/or contest, the OMNI V is the best choice.

GENERAL SPECIFICATIONS

Frequency Range: Transmit and receive on all ham bands from 160 through 10 meters in their entirety. Twelve 500 kHz segments plus 30 kHz over-shoot at the upper and lower edges of the segments.

Frequency Control: LO generated from a crystal oscillator mixed with a low noise 5.0 - 5.5 MHz phase locked loop.

Frequency Stability: Worst case, 1 PPM per degree C at 29.999 MHz.

Frequency Accuracy: + - 100 Hz @ 25 degrees C.

Antenna Impedance: 50 Ohms, unbalanced.

Printed Circuit Boards: G-10 epoxy glass.

Power Required: Receive = 1.5 A. Transmit = 20 A. 12-14 Vdc.

Dimensions: HWD 5 3/4" x 14 3/4" x 17", 14.6 x 27.3 x 43.2 cm.

Net Weight: 16 lbs. 7.25 kg.

TRANSMITTER

Modes: USB and LSB (J3E), CW (A1A), FSK (F1A). Optional FM (F3E).

DC Power Input: 200 watts maximum.

RF Power Output: ALC stabilized, adjustable from 20 watts to 100 watts (50 Ohm load) with front panel RF OUT control.

Microphone Impedance: 200 Ohms to 50k Ohms. Bias voltage for electret mic is provided in front panel connector.

CW Sidetone: Internally generated with rear panel level and tone adjustments, independent of front panel audio level control.

SSB Generation: 9 MHz, 8 pole crystal ladder filter, balanced modulator.

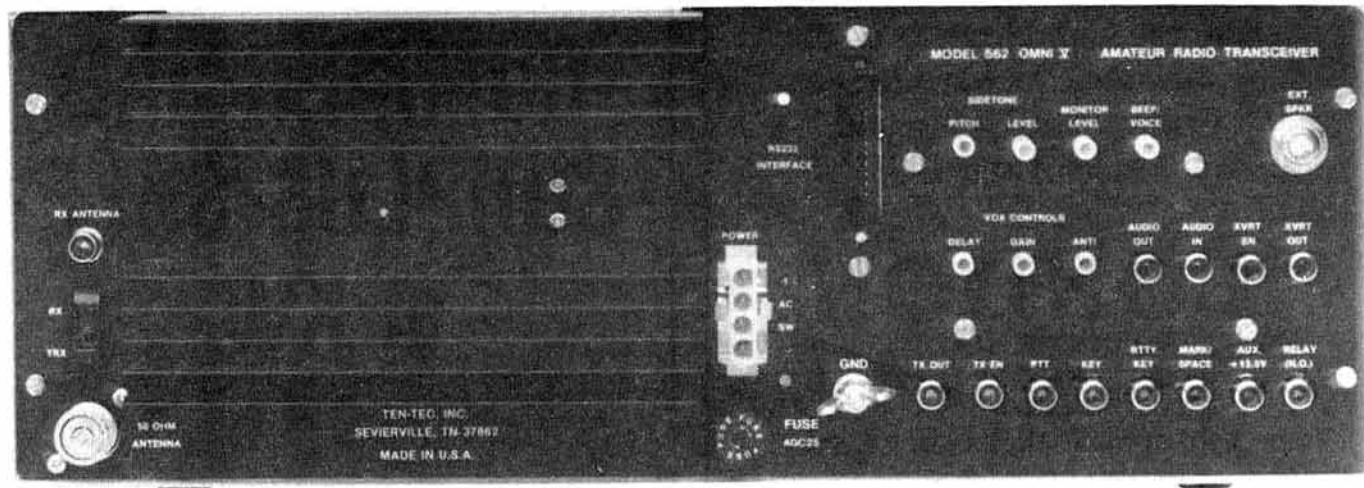
Carrier Suppression: Greater than 60 dB.

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Impressive from either end... but it's how we make ends meet that really delivers the difference.

Unwanted Sideband Suppression: Greater than 60 dB at 1.5 kHz AF input.

Harmonic Emissions: Greater than 45 dB below peak power output.

Third Order Intermod Products: -30 dB from two tone at 100 watts PEP.

Metering: Switchable forward power, SWR, collector current or audio processing level on SSB.

CW Offset: 600 Hz.

FSK Shift: 170 Hz.

RECEIVER

Modes: LSB, USB, CW and FSK. FM with optional board.

Sensitivity: .15 uV for 10 dB signal to noise ratio at 1.8 kHz bandwidth. With FM option, .3 uV for 12 dB SINAD at 15 kHz bandwidth.

Selectivity:

	-6 dB BW	-60 dB	Shape Factor
Standard 2.4 kHz	2.4 kHz	3.36 kHz	1.87:1
Opt. 1.8 kHz	1.8 kHz	2.90 kHz	1.60:1
Opt. 500 Hz	500 Hz	1.40 kHz	2.80:1
Opt. 250 Hz	250 Hz	.85 kHz	3.40:1
Opt. FM	15 kHz	30.00 kHz	2.00:1

Attenuator: -20 dB.

I-F Frequencies: 1st I-F 9 MHz, passband tuning I-F 6.3 MHz.

Image Rejection: > 100 dB.

I-F Rejection: > 60 dB average.

Noise Blanker: Switchable on/off with width adjustment.

Dynamic Range: 97 dB, measured with standard 2.4 kHz filter at 20 kHz spacing. 100 dB + with cw filters.

Third Order Intercept: +10 dBm.

Noise Floor: -133 dBm @ 2.4 kHz bandwidth.

Squelch Sensitivity: Less than .6 uV.

Receiver Recovery Time: Less than 30 ms.

Pass Band Tuning I-F Shift: + -2.3 kHz.

Audio Output: Speaker, 1.5 watts @ 8 Ohms.

Fixed level 1 mw @ 600 Ohms.

Notch Filter: 250 Hz to 2.2 kHz, greater than 50 dB notch depth.

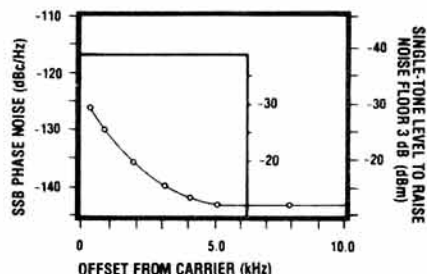
Audio Bandpass Filter: 4 pole, variable center frequency 220 Hz to 1.7 kHz, 35% band width @ -6 dB.

Tone Control: Variable 15 dB roll-off @ 5 kHz.

PHASE NOISE PERFORMANCE OF THE OMNI V

-127 dBc/Hz @ 250 Hz offset from carrier.

-146 dBc/Hz @ 5 kHz offset from carrier.



Here is a graph of the phase noise performance of the OMNI V receiver. These measurements can only be made under laboratory conditions and, even then, our test equipment is at the limit of its ability to measure the noise at the narrow offsets. The significant measurements are those close-in. Note that this graph does not even go out to 25 kHz offset where many of the published measurements are made. Certainly, we invite comparison.

Contact your local Ten-Tec dealer for further details of this truly remarkable high performance transceiver. Also ask about the rest of the amazing range of Ten-Tec 'professional' amateur equipment now available throughout the U.K. Call Fred Rendell on 021-789 7171 for details of your nearest stockist.

The DX and Contesters No. 1 choice.
Can you really afford not to have one?

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The members of Southgate Amateur Radio Club wish all Radio Amateurs and Short Wave Listeners the Compliments of the Season, and look forward to seeing you on Friday, March 9th and Saturday, March 10th, 1990, at the ...



To be held at the Picketts Lock Centre,
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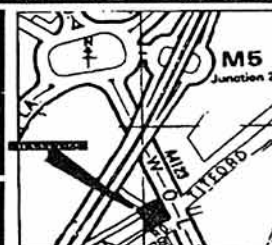
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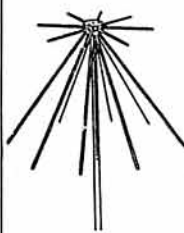
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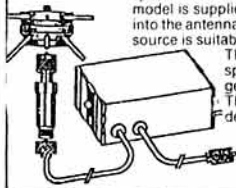


This Wide-band antenna offers an interesting alternative to the discone. It is simply an array of dipoles, but the clever bit involves arranging the dipoles to maximise bandwidth and minimise interaction. The RADAC can be set up for a range of frequencies from 27MHz to 500 MHz, and because very good impedance matches can be obtained the user can specify any six frequency bands in this range for optimised performance, either for receiving, or more usefully, for transmitting. For example, all the Amateur Bands from 10M to 70CM can be covered in one antenna. If you are in the PMR business, the RADAC can be customised for your needs. Aircraft listening enthusiasts can specify VHF & UHF Airband coverage. What a versatile antenna! Design and engineering excellence from REVCO!

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The problem with omni-directional wide-band antennas is their lack of gain. The REVCO PA3 range of wide-band pre-amplifiers complement the antennas and compensate for their shortcomings.

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The PA3I finds application in instrument work, e.g. input to spectrum analysers, boosting the output from signal generators to give a low-power Tx.

The standard version of the PA3I has BNC sockets and is designated "PA3I/B"; available to special order N-type sockets ("PA3I/N") or SO239 ("PA3I/S").

A special feature of the PA3 series is a high-pass filter to attenuate frequencies below 20MHz; high-power HF & MF broadcast stations can be very troublesome!

ON-GLASS ANTENNAS

This type of antenna mount has been around for a long time, but they are very difficult to produce successfully at VHF. The Cellular Radio Industry has popularised the glass-mount, but there are fewer problems at 900MHz, because the coupling assemblies are small. REVCO's extensive experience in making the UK's best Cellular On-glass has led to the production of superior quality VHF and UHF models. Here are a few facts which you should know:

Coupling efficiency: apart from the question of effective power transfer to the outside world, you don't want too much RF floating around inside the car, do you? Not healthy for vehicle electronic systems, and possibly not good for humans either. REVCO glass mounts feature very efficient power transfer.

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The REVCO glass mounts do cost a bit more, which reflects these superior features.

REVCO also make a full range of mobile antennas for frequencies from 27MHz to 950MHz, and new products are constantly under development. Contact your local Dealer or in case of difficulty write, phone or fax. Trade enquiries welcome.

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CONTEST NEWS

1989 VHF FIELD DAY RESULTS

VHF Field Day is THE contest of the year for many people. Most of you stated that you 'enjoyed the contest', but that the effort involved for the smaller groups actually to get a set of stations on the air was considerable. I totally agree. However, I am still waiting for your thoughts on Field Day, as requested in *RadCom*, about rule changes,

band requirements, power, aerials and the like. Do we need to have a radial ring system? Why not have 1 point per QSO multiplied by the number of countries, counties, or QRA squares worked? Please think about it and write to me QTHR.

G4DEZ VHFCC Chairman.

VHF FIELD DAY 1989

Group	50	70	144	432	1296/ 2320	Total	Pos
South of Scotland	1000	1000	787	693	477	3957	1
Sheppey Combined	446	506	800	1000	1000	3752	2
Northern Lights	616	648	1000	653	653	3570	3
Victory C.G.	733	493	721	293	344	2584	4
Martlesham Radio Soc.	339	431	777	685	342	2574	5
Windmill C.G.	244	410	546	698	584	2492	6
Flight Refuelling ARS	400	557	550	624	327	2458	7
Crawley and Reigate	261	416	547	385	558	2167	8
Ridgeway C.G.	143	316	472	509	492	1932	9
Bracknell ARC	344	419	398	342	389	1892	10
South Manchester RC etc	252	397	412	386	385	1832	11
Edinburgh and District	132	420	801	216	197	1766	12
Channel Island ARCG	505	469	521	167	65	1727	13
Leicester Poly ARC	267	247	647	288	250	1699	14
Exmoor Radio Club	200	311	85	695	401	1692	15
Horsham ARC	274	314	583	321	188	1680	16
Scunthorpe VHF C.G.	215	251	356	425	345	1592	17
Hull and Hornsea C.G.	153	383	282	341	312	1471	18
Reading & District ARC	124	352	287	250	300	1313	19
Salop ARC	297	281	309	270	139	1296	20
Cousin Jacks C.G.	161	442	556	-	-	1159	21
Surrey Radio Contact C.	190	360	261	182	131	1124	22
Leicester RS and Rugby	213	327	202	109	233	1084	23
Clifton ARS	228	358	177	166	122	1051	24
Aniel Radio Group	76	-	141	381	450	1048	25
Farnborough	120	277	253	335	61	1046	26
Plymouth Radio Club	dis	454	358	230	-	1043	27
South Dorset RS	314	228	300	128	53	1023	28
11th Hour C.G.	123	306	214	262	67	972	29
Northern Heights ARS	-	301	262	186	215	964	30
Southgate ARC	50	232	362	211	dis	855	31
Doncaster ARS	182	369	113	188	-	852	32
Hucknall Rolls Royce ARC	190	284	194	168	-	836	33
Mid-Sussex ARS	340	-	225	212	35	812	34
Verulam ARC	158	204	170	169	65	766	35
Thornton Cleveleys ARC	100	180	248	144	30	702	36
Stevenage ARCG	126	198	301	77	-	702	36
NW of Ireland ARC	71	382	160	-	-	613	38
Ellesmere Port & D.ARS	-	317	270	-	-	587	39
Maidenhead and Dist ARC	143	209	77	38	117	584	40
Welwyn Hatfield ARC	129	257	113	44	-	543	41
Southdown ARS	247	-	139	75	-	461	42
Stirling and Dist. ARS	115	76	224	14	-	443	43
Hawick Station Group	47	156	117	8	-	328	44
Ripon and Dist. ARS	134	-	131	46	-	311	45
Sears C.G.	-	-	109	199	-	308	46
Lagan Valley ARS	160	-	89	50	-	299	47
Gt. Yarmouth RC	52	119	128	-	-	299	47
The South Devon RC	39	-	55	-	-	94	49

Group	50	70	144	432	1296	Total	Posn
Warrington C.G.	882	763	1000	1000	1000	4645	1
Wirral and Dist ARC	1000	905	694	792	892	4283	2
IOM ARS C.G.	664	1000	964	805	120	3553	3
Lichfield ARS and BBC	605	767	741	755	428	3296	4
Westmoreland VHF Group	875	980	345	573	438	3211	5
The Hillbillies	566	644	403	592	847	3052	6
East Kent RC	448	530	741	743	625	2887	7
South Birmingham RS	284	449	444	566	855	2798	8
Telford and Dist. ARS	629	626	474	345	541	2615	9
The Splinters	404	470	628	438	483	2423	10
Sutton and Cheam RS	439	272	504	741	395	2351	11
Bristol and Shirehampton	190	416	359	735	496	2196	12
Kidderminster & Dist.	605	374	451	730	-	2160	13
Basingstoke ARC	410	432	472	577	197	2087	14
Torbay ARS	571	606	356	279	271	2083	15
Guildford and Dist. RS	225	370	444	440	501	1980	16
Vale of Evesham RA Club	585	469	491	307	-	1952	17
Shefford and Dist. ARS	291	419	228	344	617	1899	18
Nunsfield House ARG	386	316	144	244	498	1588	19
Mid Cheshire ARS	503	584	188	307	-	1582	20
Bristol Contest Group	299	374	357	328	-	1358	21
Wimbledon and Coulsden	445	290	241	158	202	1336	22

Dorking and District RS	343	388	203	260	-	1194	23
Goole Radio & Elect. S	265	-	492	421	-	1178	24
Cambridge and Dist. ARC	203	103	229	355	240	1130	25
Edgware and Dist. RS	149	283	216	198	247	1093	26
North Kent Radio Soc.	178	365	160	320	34	1057	27
Carrickfergus ARG	59	-	684	301	4	1048	28
Burton on Trent Dist RS	181	320	218	275	-	994	29
Weston Super Mare RS	100	279	183	415	-	977	30
Darwen ARC	200	300	337	127	-	964	31
Andover ARCG	-	-	194	184	557	935	32
Three Counties ARC	199	216	309	196	-	920	33
Vale of Glamorgan Am DX	158	-	344	317	-	819	34
Oswestry and Dist. ARC	206	-	310	238	-	784	35
Mid Warwickshire C.G.	353	-	423	-	-	776	36
Chilworth ARC & Chesham	188	341	215	-	-	744	37
Mexborough & Dist. ARS	132	143	268	119	15	697	38
Copeland C.G.	-	-	582	82	-	664	39
Dartmoor RC	24	-	235	385	-	644	40
West of Scotland ARS	184	-	264	112	64	624	41
Edenbridge ARS	170	20	98	325	-	613	42
Lancaster Uni C.G.	82	-	317	178	-	577	43
Braintree and Dist. ARS	-	-	171	246	124	541	44
Bredhurst Rec. & Tx S.	-	-	164	272	-	436	45
Hanningsfield	12	-	227	193	-	432	46
None Valley RC	-	-	168	228	-	396	47
Melton Mowbray ARS	173	-	200	-	-	373	48
Sears C.G.	-	-	131	212	-	343	49
Sheffield ARC C.G.	51	-	127	117	-	295	50
Spenn Valley ARS	85	-	103	39	-	227	51

BRS	50	70	144	432	1296/ 2320	Total	Pos
52543	1000	883	1000	1000	-	3883	1
32525	887	1000	555	226	-	2668	2
31976	-	102	741	400	-	1243	3

All scores normalised to band leader.

Congratulations to the winners and runners of each section, certificates where appropriate will be awarded to entrants. Thanks to those who sent checklogs. Please use the correct entry forms; remember next year there is a standardised site registration form, also please read the rules, they may change - do not guess or plead ignorance. Forms can be obtained from RSGB membership services or G4DEZ QTHR (large SAE please).

50MHZ

With weather conditions described in some areas as sunny and bright whilst others had rain and wind, 6 metres was introduced for the first time to VHF Field Day. Small groups and clubs enjoyed the experience of an additional band for very little extra effort in setting up, and no problems were reported interchanging 6 metre and 4 metre equipment.

Tradition dies hard and it was no surprise that one or two larger contest groups found the change unacceptable and raised points of objection. Similarly some operators bemoaned the loss of the CW session, but those with craft and guile used the mode to work stations at longer distances whilst QRM was present (making SSB contact difficult).

F/PA0ERA gave many UK stations a new QRA square and GM3WQJ/P the best DX. No 'E' contacts were reported although the ZB2VHF beacon was monitored by G3SWC/P. There was evidence of some group operators doing contests for the first time and many logging errors were made. Remember if a station defines its QTH as a distance and direction from a town then log it as such. Also a number of participants lost points because the QTH information on the cover sheet and log sheets did not tally with that actually sent over the air. Receiving

stations were not penalised in such cases.

Very few complaints about signal quality were raised and a quick adjustment of the microphone gain control resolved most issues. As usual, contest conditions found flaws in rigs; GM4BWT/P resorted to 100mW from a TS680. G3PFM/P had power line QRM, G3WGV/P operated with an antenna with not much directivity but good SWR (4 metre instead of 6 metre beam), to name a few.

Other groups' best laid plans went wrong at the start for various reasons, including coax left at home, wind damage, illness of operators or relatives. Business commitments at the last minute are unavoidable and deplete groups, but a little bit of organisation beforehand with regard to spares, operating procedures, use of check lists, and helping non-contest operators to improve their skills should all be food for thought for any club or group hoping to improve their standards for the next VHF NFD.

To recap, many silly errors lost many points and the extra verification of detail during a contact can even help the leading contestants (not just tail enders) and save time in adjudication. Congratulations to winners and runners up in each section as well as thanks to all for participating.

G8HHI

50MHZ RESULTS

Posn	Call sign	Pts	QSO	Loc	Best DX	km
1	GM3WQJ	1000	279	74NP	PA0HIP	727
2	G0ERS	733	289	90JO	G4GTYP	548
3	G4UJS	616	222	94RJ	GJ7DGJ/P	584
4	GJ7DGJ	505	147	89WF	GM3WQJ/P	631

continued on next page

5	G4BYY	446	191	01KK	GM0EWX	815
6	G3PFM	400	175	80WP	GM4BWT/P	538
7	G4AUC	344	151	80ST	GM4BWT/P	516
8	G5RV	340	177	90WV	GI4GT/P	570
9	G4MRS	339	140	01QX	GM3WOJ/P	510
10	G3SDS	314	147	80TP	GM3WOJ/P	476
11	GWOHCU	297	130	82IP	GM4YTE/P	394
12	G3SWC	274	152	90SV	GM3WOJ/P	511
13	G3ORY	267	140	92NP	G7CNA	419
14	G4MEL	261	108	01OC	GM3WOJ/P	566
15	G8APB	252	133	93EH	F/PA0ERA	416
16	G3SJV	247	124	00DR	GM3WOJ/P	557
17	G3GRS	244	111	01LD	GM3WOJ/P	551
18	G3JKY	228	134	01DH	GM3WOJ/P	507
19	G3VIP	215	100	93UK	GJ4ICD	485
20	G3HYH	213	122	92MO	GJ7DGJ/P	385
21	G4RVJ	200	94	81CC	GI4GT/P	413
22	G0LBW	190	113	93GC	GJ7DGJ/P	433
22	G4STD	190	107	91XH	G3FDW/P	409
24	G0GTI	182	95	93JK	GI4ONL/P	416
25	G3YJX	161	66	70PP	GI4GT/P	445
26	GI4GT/P	160	50	64XN	G4BYY/P	578
27	G4VER	158	99	91SR	GM3WOJ/P	437
28	G4IGY	153	66	93RS	GJ7DGJ/P	517
29	G5RP	143	101	91FN	GM3WOJ/P	408
29	G3TWG	143	84	91PN	GM3WOJ/P	441
31	G1XED	134	65	94EA	G3ZYY/P	403
32	GM4BWT	132	43	85DJ	G3PFM/P	539
33	G0AMG	129	86	91VT	GM3WOJ/P	442
34	G6LMV	126	86	91TW	GI4GT/P	474
35	G3WGV	124	87	91IH	GM3WOJ/P	441
36	G3NAT	123	74	91XG	GM3WOJ/P	496
37	G1FRS	120	81	91OF	GM3WOJ/P	468
38	GM4UYE	115	44	86EE	G3ZYY/P	618
39	G4BFH	100	53	83LU	G0ERS/P	382
40	G6DDX	76	51	91RU	GM3WOJ/P	423
41	GI4ONL	71	22	64LX	G3UEY/P	478
42	G1MUC	52	22	02UP	G3SDS/P	359
43	G4KZD	50	44	90MX	G7DOR/P	277
44	GM6UAQ	47	16	85PJ	G3UEY/P	380
45	G6ZRM	39	19	80FJ	G4UJS/P	472

Disqualified: G3ZYY/P rule 16

Checklogs gratefully acknowledged from: F/PA0ERA, G2DBT, G3BPM

RESTRICTED SECTION						
Posn	Callsign	Pts	QSO	Loc	Best DX	km
1	GW3UVR	1000	229	83JA	F/PA0ERA	444
2	G0CDA	882	219	93AD	GJ4ICD	435
3	G3FDW	875	159	84UR	G3SJV/P	478
4	G0DIO	664	114	74OD	F/PA0ERA	601
5	GW3UKV	629	162	82LQ	F/PA0ERA	408
6	GW3WAS	605	172	82JU	GJ7DGJ/P	427
6	G0KRC	605	183	82RJ	GM4UYE/P	478
8	G3UEY	585	170	92CA	GI4ONL/P	462
9	G4VUD	571	131	80FN	GM3WOJ/P	401
10	GW3ZTZ	566	141	81LT	GM4BWT/P	447
11	G0GZI	503	114	83PF	GJ7DGJ/P	547
12	G3LTY	448	100	01OI	GM3WOJ/P	409
13	G3WIM	445	138	91VG	G3FDW/P	432
14	G4ADM	439	119	93AC	GJ7DGJ/P	447
15	G3ZOI	410	123	91KH	GM3WOJ/P	470
16	G0CAD	404	128	91GI	GI4GT/P	421
17	G3EEO	386	103	93BA	GJ4ICD	426
18	G1UUS	353	114	92GB	GI7ASO/P	484
19	G7DOR	343	113	91UG	GM3WOJ/P	391
20	G0BCG	299	92	81OJ	GM3WOJ/P	422
21	G3WRJ	291	86	92VB	GM3WOJ/P	358
22	G4EYD	284	86	82XJ	GI4GT/P	382
23	G7CLY	265	56	93PW	G3SDS/P	484
24	G4XYW	225	65	91TF	GM3WOJ/P	423
25	GW1OIB	206	55	82JS	F/PA0ERA	427
26	G2XV	203	54	02AD	GM3WOJ/P	394
27	G1ECC	200	50	83SQ	-	453
28	G1CEI	199	61	91CD	-	583
29	G4HHL	190	63	81TK	GM3WOJ/P	285
30	G3MDG	188	64	91CR	GI4GT/P	448
31	G0GCG	184	36	75UW	G3ZYY/P	411
32	G0FSF	181	41	92BV	G3ZYY/P	313
33	G3WMR	178	58	91BH	G0DIO/P	391
34	G4PZO	173	59	92CT	G4VUD/P	411
35	G7AVG	179	59	01AH	G3FDW/P	410
36	GW8NVN	158	39	82FH	G3SJV/P	340
37	G4IUZ	149	67	91VR	GJ7DGJ/P	309
38	G3MWN	132	44	93JM	G3SJV/P	327
39	G4WSM	100	36	81MI	G4UJS/P	411
40	G4YDI	85	32	93DS	G4BYY/P	313
41	G6PHF	82	26	83NX	G0ERS/P	391
42	GI7ASO	59	15	74BU	-	242
43	G0HSA	51	38	93FL	G3ZOI/P	-
44	G1RCD	24	20	70XN	-	-
45	G8PHN	20	12	01GP	F/PA0ERA	200

SWL SECTION				
Posn	BRS	Pts	QSOs heard	
1	52543	1000	37	
2	32525	887	27	

EQUIPMENT USED BY LEADING STATIONS ON 50MHZ

OPEN SECTION				
GM3WOJ	IC551	10W	5 ele @ 12m	150m ASL
G0ERS	FT101	10W	5 ele @ 15m	235m ASL
	TVTR			
	4x2N3553			
G4UJS	FT726	5W	2x6 ele @ 12m	260m ASL
RESTRICTED SECTION				
GW3UVR	FT736	12W	5 ele @ 10m	600m ASL
G0CDA	IC575	10W	8 ele @ 10m	465m ASL
G3FDW	QQV0320A	20W	5 ele log periodic @ 7.5m	676m ASL

70MHZ

This contest was an excellent example of the old saying 'you can please some of the people some of the time, but you can't please all of the people all of the time'. Weather was described as excellent, average and poor conditions as very good, average and very flat and activity as good, average and low. Where you were in the country didn't seem to be particularly relevant, although the south west did seem to have the worst conditions.

The new format was welcomed by a few contestants but the majority of comments regarding the change were from entrants

who wanted the reinstatement of the CW only section. The removal of this requirement was deplored by many. The safety aspects of changing aerial arrays overnight was also mentioned.

The appearance of a GI entrant was very welcome and this station was much sought after once G stations had got used to the idea of beaming that way for a change. Several other GIs were present in the logs. There were very few poor signal complaints and no comments of Es QRM. Overall a contest with few surprises and little excitement.

G4WAD

70 MHZ RESULTS

OPEN SECTION									
Posn	Callsign	Pts	QSO	Loc	Pwr	Ant	Best DX	km	
1	GM3WOJ	1000	152	74NP	130	14Y	GJ7DGJ/P	631	
2	G4UJS	648	133	94RJ	100	8Y	GJ7DGJ/P	584	
3	G3PFM	557	135	80WP	150	2x12Y	GM0FRT	713	
4	G4BYY	506	125	01KK	150	2x7Y	GI4ONL/P	657	
5	G0ERS	493	132	90JO	25	13Y	GI4ONL/P	624	
6	GJ7DGJ	469	78	89WF	25	3Y	GM3WOJ/P	631	
7	G3ZYY	454	95	80AQ	120	4Y	GM4RZW/P	523	
8	G4ADV	442	78	70PP	80	2Y	G4UJS/P	503	
9	G4MRS	431	104	01OX	160	8Y	EI2WW/P	522	
10	GM4RZW	420	66	85DJ	80	7Y	G3GRS/P	565	
11	G3UAX	419	107	80ST	150	2x5Y	GI4ONL/P	556	
12	G4MEL	416	101	01OC	150	10Y	GM4RZW/P	578	
13	G3GRS	410	102	01LD	30	6Y	GM4RZW/P	565	
14	G4HRY	397	117	93EH	150	6Y	GJ7DGJ/P	455	
15	G4IGY	383	85	93RS	80	8Y	GJ7DGJ/P	517	
16	GI4ONL	382	50	64LX	100	6Y	G4BYY/P	657	
17	G6YZC	369	99	93JK	10	12Y	GI4ONL/P	416	
18	G4FUU	360	117	91XH	25	6Y	GI4ONL/P	611	
19	G3JKY	358	115	01DH	100	5Y	GM3WOJ/P	507	
20	G3WGV	352	114	91IH	50	8Y	GM7CMY/P	583	
21	G3HYH	327	110	92MO	25	9Y	GJ7DGJ/P	385	
22	GW4WSE	317	89	83JG	10	30Y	-	-	
23	G5RP	316	107	91FN	60	9Y	GI4ONL/P	526	
24	G3SWC	314	100	90SV	120	6Y	GM3WOJ/P	511	
25	G4SSS	311	76	81CC	-	7Y	GM4RZW/P	477	
26	G3NAT	306	97	91XG	100	5Y	GM3WOJ/P	496	
27	G4GAK	301	76	93BS	50	2x4Y	GJ7DGJ/P	506	
28	G0LBW	284	103	93GC	50	4Y	GJ7AOG/P	433	
29	GWOHCU	281	84	82IP	60	5Y	GJ7DGJ/P	388	
30	G1FRS	277	90	91OF	50	60	GM3WOJ/P	468	
31	G0AMG	257	91	91VT	100	4Y	-	-	
32	G3VIP	251	69	93UK	5	8Y	GJ7DGJ/P	485	
33	G3ORY	247	89	92NP	30	2x3Y	GJ7DGJ/P	390	
34	G4KZD	232	85	90MX	70	50	EI2WW/P	-	
35	G3SDS	228	72	80TP	10	32L	GM3WOJ/P	476	
36	G3TWG	209	73	91PN	50	4Y	GM3WOJ/P	441	
37	G4VER	204	76	91SR	10	8Y	GM3WOJ/P	437	
38	G0HOP	198	69	91TW	8	2Y	GM4RZW/P	443	
39	G4ATH	180	46	83LU	25	-	-	-	
40	GM6UAQ	156	30	85PJ	25	5Y	G0ERS/P	542	
41	G4GLI	119	29	02UP	30	LP	GM3WOJ/P	487	
42	GM7CMY	76	9	86EE	25	6Y	G3PFM/P	624	

RESTRICTED SECTION									
Posn	Callsign	Pts	QSO	Loc	Pwr	Ant	Best DX	km	
1	G0DIO	1000	105	74QD	10	5Y	GJ7DGJ/P	572	
2	G3FDW	980	105	84UR	25	6Y	GJ7DGJ/P	612	
3	GW3UVR	905	144	83JA	15	6Y	GM0FRT	-	
4	GW3WAS	767	124	82JU	25	8Y	GM0FRT	460	
5	G0CDA	763	136	93AD	25	7Y	GJ7DGJ/P	435	
6	GW3ZTZ	644	114	81LT	10	12Y	GM7CMY/P	488	
7	GW3UKV	626	115	82LQ	25	8Y	GJ7DGJ/P	389	
8	G3LHJ	606	77	80FN	12	4Y	GM4RZW/P	537	
9	G4CAX	584	98	83PF	25	4Y	GJ7DGJ/P	447	
10	G3LTY	530	74	01OI	25	12Y	GM3WOJ/P	547	
11	G4CIZ	470	94	91GI	25	4Y	GI4ONL/P	548	
12	G3UEY	469	103	92CA	25	5Y	GI4ONL/P	478	
13	G4EYD	449	98	82XJ	25	6Y	GJ7AOG/P	347	
14	G3ZOI	432	88	91KH	10	6Y	GI4ONL/P	556	
15	G3WRJ	419	81	92VB	25	6Y	GI4ONL/P	556	

16	G4HHL	416	80	81TK	25	5Y	G14ONL/P	501
17	G7DOR	388	80	91UG	20	5Y	GM3WOJ/P	484
18	G4GXP	374	82	82RJ	20	4Y	GJ7AOG/P	348
19	G0GRG	374	70	81QJ	25	4Y	G14ONL/P	495
20	G3PJX	370	83	91TF	25	8Y	GM3WOJ/P	484
21	G3WMR	365	67	01BH	15	6Y	GM3WOJ/P	499
22	G3MDG	341	83	91OR	2.5	4Y	GM3WOJ/P	420
23	G8OZP	320	63	92BV	8	3Y	G4ADV/P	318
24	G3EEO	316	63	93BA	10	4Y	GJ7DGJ/P	421
25	G1ECC	300	58	83SQ	20	4QY	G3LTY/P	538
26	G3WIM	290	67	91VG	8	3Y	GM4RZW/P	514
27	G4IUZ	283	76	91VR	25	4Y	GM3WOJ/P	448
28	G4WSM	279	47	81MI	15	3Y	GM4RZW/P	459
29	G4ADM	272	59	93AC	1.5	5Y	G4ADV/P	333
30	G1CEI	216	45	91LD	7	DIP	GM3WOJ/P	467
31	G3MWN	143	30	93JM	2	4Y	GD0ILF	364
32	G2XV	103	24	02AD	20	4Y	GM3WOJ/P	427
33	G1YXU	20	6	01AH	20	2Y	G3VIP/P	237

Posn	BRS	Pts	QSO	Loc	Ant	Best DX	km
1	32525	1000	68	01AL	DIP	GM3WOJ/P	481
2	52543	883	40	83LT	2Y	G4BVP/P	373
3	31976	102	9	01HO	WIRE	G0CDA/P	245

144 MHZ

VHF Field Day saw a relatively low level of activity. A combination of flat conditions and upwards of five hundred VHF biased operators sitting on hilltops and therefore not working individually from home, reduced the number of G stations active considerably.

No bad signal complaints were made; any problems were sorted out amicably on the day by calling the 'offending' station and discussing the problem. Please be polite when making a complaint and remind the other station to record your comments in his log as well. With over one hundred groups active the level of QRM is inevitably high, with no 'gaps' in the band between 150 and 400 in the south of the UK (why not use up to 500 - non contest QSOs can still take place in the multi-mode section). Foreign DX must be very loud, or will have to ask politely for a space!

No comments were made requesting different rules and most entries were in good order, but please everyone double check your paperwork - after all at least a weekend's work by your group of maybe 4 to 10 operators went into generating it. Computer printed logs are not in favour

(most have errors); if you want to submit computer generated logs, do it properly. Typical errors are no totals on each page, poor print quality, and typing errors. Use the same layout as a standard manually written contest log sheet.

There was the usual crop of generator failures and amplifier blow-ups; one group got through three valve amplifiers and two generators (no mention of the callsign but it was close to home and would embarrass me (G8TFI) too much). GM4HAM also had several linear problems but must be congratulated for doing so well in obtaining the runners up spot. Northern Lights CG had a convincing 25% margin in the Open section. Their operating skills, location, equipment, two twin valve amplifiers and two four yagi arrays proved too much for the opposition (*The station was inspected by VHFCC chairman and was found to be as registered as per rule 16 - G4DEZ*). Congratulations also go to Warrington G3CKR and GD4IOM the winners and runners up respectively in the restricted section, both putting in excellent scores, and to BRS52543 in the listener section.

G8TFI

144 MHZ RESULTS

Posn	Callsign	Pts	QSO	Loc	Ant	Best DX	km
1	G4APA	1000	752	94RJ	4x17	979	
2	GM4HAM	801	628	85DJ	4x14	1363	
3	G4ZAP	800	674	01KK	4x19	786	
4	GM3WCS	787	705	74NP	2x16	1118	
5	G4MRS	777	593	01QX	2x18	756	
6	G8LNC	721	666	90JO	4x19	819	
7	G3SDS	647	686	92NP	4x14	838	
8	G4HRS	583	596	90SV	2x14	880	
9	G4VRL	556	472	70PP	4x10	778	
10	G4RFR	550	488	80WP	2x19	865	
11	G3WSC	547	461	01OC	2x17	741	
12	G0FBB	546	511	01LD	4x9	780	
13	GJ1TJP	521	389	89WF	16	780	
14	G3PIA	472	533	91FN	2x17	674	
15	G8SMR	412	511	93EH	2x17	902	
16	G4TDL	398	430	80ST	2x17	794	
17	G3SFF	362	431	90MX	15	-	
18	G3PRC	359	354	80AQ	16	783	
19	G4ERG	356	383	93UK	2x16	681	
20	GW3NSY	309	396	82IP	2x17	752	
21	G4VAT	301	378	91TW	4x9	703	
22	G8SDS	300	338	80TP	2x13	740	
23	G4CCC	287	393	91IH	17x13	798	
24	G4YTV	282	308	93RS	19	705	
25	GW3CSA	270	370	83JG	17	530	
26	G2SU	262	345	93BS	10	713	
27	G4DDY	261	332	91XH	16	883	
28	G0FRS	253	340	91OF	2x16	763	
29	G6GMW	248	310	83LU	16	856	
30	G3ZMS	225	303	90WV	2x16	677	
31	GM4TMS	224	179	86EE	4x19	780	
32	G8MNY	214	342	91XG	2x17	588	

33	G4APD	202	292	92MO	17	663
34	G0JUN	194	297	93GC	2x8	539
35	G3GHN	177	250	01DH	2x18	649
36	G3VER	170	305	91SR	4x17	599
37	G3CFH	160	105	64LX	17	779
38	G0FEH	141	227	91RU	8	564
39	G1KAR	139	140	00DR	15	656
40	G1WCY	131	178	94EA	2x17	534
41	G3YRC	128	118	02UP	17	736
42	GM1JKJ	117	105	85PJ	2x14	662
43	G0ITW	113	174	93JK	2x13	718
44	G3WGC	113	182	91VT	2x8	613
45	G4RSE	109	156	01EN	19	631
46	G4GTY	89	76	64XN	17	707
47	G6OPW	85	98	81CC	14	888
48	G3WKK	77	145	91PN	17	763
49	G4SSD	55	68	80FJ	2x13	562

Posn	Callsign	Pts	QSO	Loc	Ant	Best DX	km
1	G3CKR	1000	574	93AD	15	925	
2	GD4IOM	964	364	74QD	17	709	
3	GW3NLY	741	425	82JU	14	740	
4	G6EKR	741	310	01OI	19	737	
5	GW4MGR	694	454	83JA	16	756	
6	G1OLIX	684	233	74BU	13	735	
7	G3WOI	628	362	91GI	17	764	
8	G6HEF	582	304	84IH	17	616	
9	G4FKA	504	343	93AC	14	562	
10	G0GLE	492	270	93PW	17	628	
11	G0ERA	491	361	92CA	14	831	
12	GW3ZME	474	311	82LQ	19	741	
13	G3TCR	472	317	91KH	19	722	
14	G4CTU	451	350	82RJ	13	-	
15	G5RS	444	301	91TF	17	620	
16	G1OHM	444	381	82XJ	19	716	
17	G0KAQ	423	299	92GB	8	578	
18	GW8NEY	403	273	81LT	17	594	
19	G4AHG	359	240	81TK	17	662	
20	G4WAW	357	261	81QJ	17	576	
21	G3NJA	356	182	80FN	17	828	
22	G0ANT	345	138	84UR	11	718	
23	GW0JCB	344	198	82FH	13	530	
24	G4JS	337	189	83SQ	16	631	
25	G7AAB	317	165	83NX	17	588	
26	GW1ORA	310	190	82JS	16	-	
27	G4WWR	309	215	91LD	19	678	
28	G4BTS	268	154	93JM	18	566	
29	GM4AGG	264	88	75UW	8/8	759	
30	G4FUR	241	161	91VG	8/8	520	
31	G1RCD	235	118	70XN	17	588	
32	G8EYV	229	136	02AD	17	-	
33	G3FJE	228	154	92VB	16	580	
34	G8PHN	227	132	01GP	10	-	
35	G3NFC	218	154	92BV	8	541	
36	G3ASR	216	145	91VR	13	593	
37	G0ACL	215	174	91OR	5	391	
38	G3CZU	203	158	91UG	13	701	
39	G4FOX	200	138	92OT	13	717	
40	G0ARC	194	148	91FH	9	504	
41	G3ZTT	188	119	83PF	17	606	
42	G4WSM	183	-	-	-	-	
43	G6BRH	171	113	01HU	13	486	
44	G4NWZ	168	117	92GP	14	551	
45	G7BRC	164	138	01HH	-	-	
46	G4CW	160	127	01BH	16	520	
47	G4PYZ	144	96	93BA	13	452	
48	G7BVV	131	103	82VJ	8	518	
49	G0INF	127	109	93FL	12	474	
50	G3SVC	103	64	93DS	16	510	
51	G0JOH	98	89	01AH	17	495	

Posn	BRS	Pts	QSO	Loc	Ant	Best DX	km
1	52543	1000	68	01AL	DIP	GM3WOJ/P	481
2	31976	883	40	83LT	2Y	G4BVP/P	373
3	32525	555	9	01HO	WIRE	G0CDA/P	245

432 MHZ

This year conditions on 432MHz were described as everything from abysmal to good, the only noticable trend being that the higher up the results table a group was, the poorer conditions were! One station worked only 7 stations in the first seven hours then changed antenna and feeder to discover plenty of activity.

It was pleasing to see all stations receiving poor signal quality reports taking strenuous efforts to isolate the problems, in all cases with success. Entrants are reminded that these problems cannot always be blamed on transmitter deficiencies, as receivers have their shortcomings as well.

Logging varied from reasonable to

appalling (*I should really have disqualified a few, they were so tatty - G4DEZ*). Overall only 15% of entrants managed to lose zero points, the maximum lost by a station being 403 points, 14% of the station's score! Only two unmarked duplicates were found in the logs, the majority of points being lost due to incorrectly recorded callsigns. Some of these may have been transcription errors; this is perhaps how one station ended up claiming a QSO with Guadeloupe, so always double check before posting the entry!

Congratulations to the winners of their respective sections, G8TFI/P and G8XVJ/P, and to G4FAM/P and GD4GNH/P, who won the tight competition to become runners-up.

G4FRE

432 MHZ RESULTS

Posn	Callsign	Pts	QSO	Loc	BestDX	km
1	G8TFI	1000	327	01KK	DK6AS	686
2	G4FAM	698	245	01LD	DK6AS	690
3	G4JKN	695	246	81CC	DC8VJ	793
4	GM4TXX	693	211	74NP	PE1GHG	694
5	G4MRS	685	232	01OX	DK7NP/P	712
6	G4GCM	653	208	94RJ	DH0FAP/P	821
7	G0FRR	624	252	80WP	DJ6EP	630
8	G3SEK	509	244	91FN	DK0JK/P	671
9	G0JRB	425	182	93UK	LA1YCA/P	702
10	G3FVA	386	190	93EH	DK0VS/P	713
11	G5LK	385	150	01OC	GM4TXX/P	566
12	G2LO	381	209	91RU	DL6WU	682
13	G4BRA	342	153	80ST	PA0RDY	536
14	G4PWN	341	140	93RS	DK0VS/P	685
15	G6FRS	335	178	91OF	GM0GAC/P	572
16	G3WZT	321	154	90SV	DK0JK/P	592
17	G8NEH	293	144	90JO	G10GDP/P	567
18	G6IFU	288	170	92NP	DL2KBB	523
19	GW3SRT	270	140	82IP	F/PA0OOM	429
20	G6CSY	262	164	91XG	GM0HLK/P	519
21	G0CCC	250	156	91IH	PA3DJJ	543
22	G4HTD	230	89	80AQ	PA0EZ	657
23	GM0HLK	216	74	85DJ	G5LK/P	578
24	G1ZMS	212	119	90VV	DK0VS/P	581
25	G3ZVW	211	127	90MX	PA0GUS/P	499
26	G6RSE	199	111	01EN	DL2NO	594
27	G8JJR	188	114	93JK	PE0MAR/P	394
28	G4EMW	182	125	91XH	DK0VS/P	519
29	G8VER	169	107	91SR	DK0JK/P	599
30	G4JSM	168	105	93GC	PA0PLY	446
31	G6TMM	167	51	89WF	PA0GUS/P	684
32	G4TJE	166	114	01DH	GM0HLK/P	526
33	G6WVG	144	74	83LU	GJ6TMM/P	516
34	G0FAJ	128	80	80TP	PA0GUS/P	605
35	G3LRS	109	85	92MO	GM0HLK/P	359
36	G0BWW	82	40	84IH	-	-
37	G0FCU	77	53	91TW	GM4TXX/P	424
38	G3WQK	75	43	00DR	GM4TXX/P	557
39	G4GTY	50	25	64XN	G8NEH/P	548
40	G4SUM	46	29	94EA	PA0PLY	483
41	G4WSL	44	40	91VT	PE0MAR/P	298
42	G3LVW	38	26	91PN	GM4TXX/P	441
43	GM0GDL	14	9	86EE	GW0DVP/P	353
44	GM1AQV	8	7	85PT	G4GCM/P	178

RESTRICTED SECTION

Posn	Callsign	Pts	QSO	Loc	BestDX	km
1	G8XVJ	1000	186	93AD	ON7WR/A	515
2	GD4GNH	805	91	74OD	F/PA0OOM	603
3	GW0DVP	792	153	83JA	PA0GUS/P	478
4	GW3NKC	755	130	82JU	PE0MAR/P	585
5	G0EKR	743	108	01OI	DK6AS	667
6	G0BWW	741	145	93AC	F1HNO/P	534
7	G3TAD	735	109	81TK	PA0VVH	570
8	G6KRC	730	145	82RJ	DJ9VDA	737
9	GW4THB	592	116	81LT	PA0PLY	557
10	G0JSR	577	123	91KH	GM0HLK/P	485
11	G4RCD	573	63	84UR	F/PA0OOM	584
12	G8OHM	566	126	82XJ	PA0PLY	480
13	G6GS	440	109	91TF	GM4TXX/P	484
14	G4UHF	438	105	91GI	GM4TXX/P	431
15	G8HSG	421	71	93PW	F/PA0OOM	486
16	G4WSM	415	77	81MI	PA0PLY	543
17	G4ILI	407	106	92CA	PA0EZ	405
18	G1RCD	385	49	70XN	G4GCM/P	487
19	G6ASH	355	72	02AD	PA2HUS	437
20	GW6ZME	345	74	82LQ	PE0MAR/P	492
21	G6RCT	344	76	92VB	GM4TXX/P	422
22	G4GCT	328	80	81QJ	GM0HLK/P	451
23	G8PPQ	325	83	01AH	GD4GNH/P	444
24	G8TNK	320	68	01BH	GM0HLK/P	520
25	GW1VRW	317	55	82FH	PE0MAR/P	524
26	G8ZTT	307	67	83PF	G4FAM/P	341
27	G10GDP	301	36	74BU	G8TFI/P	589
28	G0EMU	279	57	80FM	G4GCM/P	476
29	G7BOT	275	60	92BV	PE0MAR/P	420
30	G0BRC	272	69	01HH	GM4TXX/P	522
31	G6XVW	260	74	91UG	GM4TXX/P	484
32	G4JXG	246	56	01HU	GM4TXX/P	479
33	G8KGC	244	53	93BA	PE0MAR/P	421
34	GW7CPI	238	49	82JS	F/PA0OOM	427
35	G6GWZ	228	59	92PG	PA0PLY	393
36	G0BWW	221	38	84IH	G8BIS	454
37	G4XOM	212	52	82VJ	F/PA0OOM	352
38	G4RMD	198	57	91VR	GM4TXX/P	450
39	G6WWR	196	55	91LD	G4GCM/P	364
40	G8PHN	193	38	01GP	GM4TXX/P	501
41	G6GFO	184	48	91FH	PI4KML	434
42	G6OUT	178	30	83NX	G8TFI/P	379
43	G6HC	158	46	91VG	PE0MAR/P	399
44	G2AKK	127	31	83SQ	G0FRR/P	338
45	G6FUM	119	37	93JM	G0FRR/P	326
46	G1VOV	117	44	93FL	G0FRR/P	372
47	GM0GAS	112	16	75UW	G0FRR/P	605
48	G7CSU	39	12	93DS	G8TFI/P	313

Checklogs received with thanks from G18NBW/P, G0CLP/P and G4BZP/P

Pos	BRS	Pts	QSO	Loc	Best DX	km
1	52543	1000	32	83LT	F/PA0OOM	513
2	31976	400	25	01HU	GM4TXX/P	499
3	32525	226	15	01AL	G4JKN/P	270

EQUIPMENT USED BY LEADING STATIONS ON 432MHZ

Callsign	TX	RX	Ant
G8TFI/P	LS707	FT726Q	8x19 @14m
	2x4CX250B	MGF1302 RF	QTH 50m ASL
G4FAM/P	TS780	TS780	2x21 @21m
	2x4CX250B	3SK76RF	QTH 180m ASL
G4JKN/P	FT102+MM tvtr	MM tvtr	4x28 @12m
	2x4CX250B	FT102	QTH 485m ASL

Callsign	TX	RX	Ant
G8XVJ/P	TS780+40W PA	TS780	21 @10m
		MGF1402 RF	QTH 465m ASL
GD4GNH/P	TS430+MM tvtr	MM tvtr+TS430	21 @8m
			QTH 190m ASL
GW0DVP/P	TS430+h/b tvtr	h/b tvtr+TS430	21 @10m
	+50W PA	MuTEK MHP	QTH 600m ASL

MICROWAVES - 1296 & 2320MHZ

Once again the majority of entrants described conditions as worse than below average with those in the Restricted Section suffering most, and those in the Open Section merely claiming conditions were flat. Despite this, scores and QSO numbers show an average increase of 10% on 23cm compared to last year and slightly more on 13cm even though the leading scores are almost the same. In answer to the comments that activity appears to be reducing, there were 255 different callsigns in the 23cm logs and 63 in the logs for 13cm, only a small number of these being outside of the UK.

This year there were two requests to make 13cm count as a separate band or to at least allow simultaneous working to avoid impairing the operation of the 23cm station (G0FRE and G3YKI). It does appear that the benefits of manning a 13cm station for 24 hours are small compared to the amount of points to be possibly gained on 6m and it is always uncertain how many contacts may be lost whilst struggling on 13cm for a few points. Perhaps a multiplier should be considered? (G8VOI).

G8OPR also requested that 13cm be reintroduced for the restricted section and enclosed a log to demonstrate the possibilities - it might appear that 13cms is growing up, yet G4FRS thought activity on both bands only warranted 12 hours operation. There were the usual equipment problems reported, G4MRS stating that 23cm was an embarrassing, complete and unmitigated disaster area. Others noted several in-

stances of IF breakthrough and more than one station made contact with other groups in error; sorry but they weren't allowed!

The 2C39 type valve was almost universally used as a PA device. Just under half used a pair in the Open Section, another third using a single valve. G3YKI claimed the largest output with 300w from a TH328 and GM4BYF had four 2C39's in use to greatly improve their performance. In the Restricted Section over half used the 2C39 and there were only five stations using a barefoot MM transverter, once the norm for this section. The Mitsubishi PA slab has not yet made an impression with only G4WDL and G3ZTR using them as a PA device. On 13cms there were only two barefoot transverters in use, five various low power transistor amplifiers of 3W or less, ten single and two pairs of 2C39s, again showing how the band is advancing.

All but three used dishes (from 1.2m to 3m) in this band, four using a dual band feed. Almost half of the Restricted Section used the 55 ele, the remainder using dishes or QLY in equal numbers. There was no particular pattern to the type of aerial used in the Open Section other than maybe 'bigger is best'. There were almost equal number of dishes, QLY and straight yagis but almost a third were using groups of four or larger. G4XUM has the prize for the most booms, but G4WHO had the most elements with an 8x50 QLY array at 15m. A final quote from GW0DAY: 'were conditions poor or was it our station?'. Let's hope conditions (and equipment?) continue to improve for next year.

G4NBS

MICROWAVE RESULTS

		OPEN SECTION					
Posn	Callsign	Total	Loc	QSO	km	QSO	km
1	G0FRE	1000	01KK	114	531	44	467
2	G4XUM	653	94RJ	72	532	21	443
3	G8XIR	594	01LD	105	574	12	238
4	G3GRO	558	01OC	78	589	18	391
5	G3NNG	492	91FN	97	605	17	393
6	GM4BYF	477	74NP	64	568	-	-
7	G3YKI	450	91RU	94	694	17	395
8	G4HGU	401	81CC	56	555	10	555
9	G0FCT	389	80ST	64	516	16	419
10	G3UHF	385	93EH	73	475	9	268
11	G4CCH	345	93UK	59	449	-	-
12	G8VOI	344	90JO	61	424	18	424
13	G4MRS	342	01OX	51	376	13	349
14	G4WHO	327	80WP	55	537	14	284
15	G3ZTR	312	93RS	51	458	11	371
16	G3ULT	300	91IH	81	459	12	158
17	G4OOR	250	92NP	57	500	1	92

18	G4JDI	233	92MO	57	395	-	-
19	G4ENR	215	93BS	45	450	-	-
20	GM4OGM	197	85DJ	30	516	2	231
21	G3NPF	188	90SV	59	389	-	-
22	GW4LU	139	82IP	34	345	-	-
23	G8TB	131	91XH	51	262	12	113
24	G3BSN	122	01DH	40	507	10	185
25	G3VCT	117	91PN	45	440	-	-
26	G4AVV	67	91XG	41	262	-	-
27	GJ8PCY	65	89WF	11	455	-	-
27	G0EVD	65	91SR	44	241	-	-
29	G4FRS	61	91OF	30	168	9	122
30	G4NTS	53	80TP	17	475	-	-
31	G3RXJ	35	90WV	17	186	-	-
32	G8KBH	30	83LU	12	176	-	-

Checklogs gratefully received from G8OPR/P (2.3GHz) and G3GIM (both bands).
G3RWL/P disqualified - incorrect scoring method.

RESTRICTED SECTION							
Posn	Call sign	Pts	Loc	QSO	km		
1	G4WDL	1000	93AD	71	494		
2	GW0JSB	892	83JA	61	369		
3	G3OHM	855	82XJ	63	441		
4	GW4HWA	847	81LT	54	494		
5	G4ICM	625	01OI	50	547		
6	G4TXG	617	92VB	69	446		
7	G8OPR	557	91FH	49	433		
8	GW0CZD	541	82LQ	38	492		
9	G4YPC	501	91TF	61	484		
10	G6KUI	498	93BA	43	485		
11	G0CFM	496	81TK	42	450		
12	G4PSU	483	91GI	56	450		
13	G3JYP	438	84UR	24	455		
14	GW0DAY	428	82JU	35	290		
15	G0GZQ	395	93AC	36	430		
16	G4ELZ	271	80FN	23	376		
17	G3SJE	247	91VR	28	447		
18	G6KWA	240	02AD	29	329		
19	G8WIM	202	91VG	31	309		
20	G8FMH	197	91KH	30	370		
21	G8ZHF	124	01HU	17	316		
22	GD6ICR	120	74QD	10	210		
23	GM6FPX	64	75UW	6	331		
24	G8BHD	34	01BH	5	191		
25	G0HEG	15	93JM	5	107		
26	G6ECV	4	74BU	2	68		

RULES

VHF CONTESTS RULE 16

A station must operate within the terms of his/her normal licence (this excludes High Power Permits). Special event call signs may not be used.

Where normal contests are concerned (not low power) DTI Licence Conditions apply. VHFCC are not concerned about what type of output device is used, so long as the signal produced is clean and does not exceed DTI licence limits.

With regard to the 'low power' and 'restricted' sections of VHF Field Day, any final amplifying device(s) capable of delivering more than twice the stipulated power limit for that contest must be registered with the VHFCC Chairman as described later.

Any amplifying device(s) in the case of Open contests capable of more than 1kW output must also be registered.

Registration

Registration must be made with the VHFCC Chairman G4DEZ QTHR.

Registration of equipment must be made at least 28 days before the equipment is used on its first contest. Once registered (and as long as there are no changes to the equipment) registration stays in force permanently; all that is required for subsequent use is a postcard at least 28 days before any other contest showing that the registered equipment will be in use again and where.

For initial registration I need to know the type of equipment, its normal power output, and how you propose to run it during the contest so as to comply with the DTI licence or any lower limit as required by the rules of

the contest in question. Modifications must be of a semi-permanent nature and not just a switch or reduction of drive level.

A fixed drive level, which is not capable of driving the amplification devices to a level which exceeds the DTI or contest limits is acceptable, but must still be registered. Wired-in attenuation can be used, provided that it can not be easily removed after the inspector has checked out the station.

Penalties

If unregistered equipment is found, whether during an inspection or otherwise, the result will be DISQUALIFICATION and a possible ban on entering VHF contests.

If equipment does not conform to the registration details and is capable of delivering more than 1kW, the result will be DISQUALIFICATION (at the discretion of VHFCC) and the group will not be allowed to compete in RSGB contests for period of 1 year. The group will be permanently barred from ANY future event if there is any subsequent irregularity of the same nature.

DEFINITION OF MAJOR AND MINOR ERRORS IN VHF CONTESTS

The VHFCC have issued a corrected version of the definition of major errors, published on page 79 of October's *RadCom*. Other definitions remain the same.

Major errors

1. Declarations unsigned or not dated.
2. Operators not listed.
3. Final stage or power information missing.
4. Incorrect stationery used, adjudicator to supply correct forms with returned log.
6. Logs with missing contact information, eg no times or no location.
7. Computer generated logs not complying

with standard formats, eg too many QSOs per page or columns transposed.

8. Grossly inaccurate scoring (where this is not viewed as a deliberate attempt to inflate the score).

9. Missing summary sheets in multiband, cumulative and AFS events.

10. Entries sent to the wrong address. Will be used as checklogs.

11. Missing declarations of club membership in AFS events.

FOREIGN ENTRANTS TO RSGB VHF CONTESTS

Please note that in addition to the information on page 78 of October's *RadCom*, the VHFCC has issued notification that there will be a separate section for continental entries.

RESULTS

MAY 432MHZ-24GHZ RESULTS

A couple of errors crept in to the results table headed 'Overall Positions - All Other Section' for this contest on page 80 of October's *RadCom*. Hadrabs & Tarts CG achieved 1st place on 24GHz, scoring 5623 points, and the Northern Lights CG scored 3000 points.

144MHZ AND SWL CONTEST MAY 1989

This contest was blessed with excellent conditions into most of the UK, only parts of GM, GD and GU finding the going rough.

The band was wide open into DL, Y, OK and OZ for many hours on both days with one report of an HA having been heard. Several contestants commented on the lack of splatter on the band, perhaps as a result of more responsible attitude from contestants or maybe a lack of activity from within the UK.

There were some objections to the fact that the contest coincided with a Bank Holiday, and there were also comments from outlying parts regarding the scoring system and its supposed bias to the South East (I'm sure I can remember contests being won from GI back in medieval times, G4DEZ).

Congratulations to all the winners and runners-up, and thanks to everyone else who entered for an excellent set of logs. Certificates will be awarded to G4APA/P and G0CDA/P in the Multi-Op section, and G4PIQ and G4BZP/P in the Single-Op and BRS31976 in the SWL section.

G4WAD

50MHZ TROPHY CONTEST 1989 RESULTS

This year's 50MHz Trophy event was described by the majority of entrants as good, most considering it best before lunch. There were reasonable amounts of sporadic E, but, as the Best DX columns below indicate, not everyone experienced it; the old adage of 'being in the right place at the right time' was particularly applicable. For the record, 14 countries were active, in addition to the G prefixes; CT1, F, OH, T77, ZB2 and 7X were also active. Log keeping was good, the only confusion being whether ZB2/P/

144MHZ AND SWL CONTEST MAY 1989

MULTIOPERATOR											
Posn	Call	Pts	Multi	QSOs	Loc	Pwr	Ant	Best DX	Km		
1	G4APA/P	2023800	100	1144	94RJ	400	4X17	DL4MDQ	1037		
2	G0CDA/P	1265495	95	920	93AD	400	90el	DL4MDQ	1058		
+4X9											
3	G8LNC/P	1045486	79	938	90JO	400	4X19	OZ5TG	940		
4	G3EFX/P	791800	74	809	90XV	400	2X17	OZ1WE	877		
5	GW4BYV/P	789250	82	757	81NV	400	50el	DB7OB	946		
6	G4RFR/P	768485	85	649	80AQ	400	2X19	DG6LS	1035		
7	G4SIV	714070	70	743	92TR	400	4X16	DH3NAN	847		
8X9											
8	GM0FRT/P	646855	95	410	86RW	400	2X19	DL0OUD/P	893		
9	G4ERG/P	635352	69	623	93UK	400	4X11	OK1IBL	926		
2X16											
10	G4RBY/P	618560	80	646	81UC	150	20el	DB7OB	910		
11	G3FKF/P	478884	84	539	81XA	180	6Q	DL3LAC	859		
12	G4UHF/P	460434	78	560	91LT	50	2X17	GD4FBJ	809		
13	G5RS/P	333847	65	478	01BA	400	2X17				
14	G7APD/P	319476	79	501	92JH	400	4X9	DL8AAV	780		
15	G3XVA/P	284639	71	409	91FU	300	2X11	DL4OBI	804		
16	GD4IOM	230179	53	384	74QD	400	4X17	DL0OUD/P	853		
17	GM4TMS/P	173530	70	216	86EE	200	4X19	G1POK	674		
18	G0JUN	152728	68	285	93JA	300	2X7	DF9QTE	670		
19	G8SMR/P	145040	80	291	83WD	350	16el	DL0OUD/P	665		
20	G4SSD	112914	51	200	80FJ	200	2X11	DL4OBI	984		
21	G1KAR/P	72906	29	190	00DR	240	15el	DL4OBI	725		
22	GW1SPU/P	8475	25	47	82IU	15	9el	PA3EZA	607		
23	GU1WDT	5460	20	39	89RL	100	2X16	G4APA/P	563		
SINGLEOPERATOR											
Posn	Call	Pts	Multi	QSOs	Loc	Pwr	Ant	Best DX	Km		
1	G4PIQ	521916	69	626	01MU	300	14el	HB9QQ	750		
2	G4BZP/P	263492	76	361	84KD	80	8el	DL0OUD	763		
3	G8MKD	130296	61	247	92AL	50	4X9	DL4OL	822		
4	G1JXX/P	120445	65	163	95AG	70	9el	DL0OUD	751		
5	G4KIS/P	73500	50	124	64JE	100	9el	DL0OUD	1018		
6	G4HXO/P	53753	49	119	70NJ	75	14el	GM0FRT/P	743		
7	G6HLL/P	43956	54	142	83PF	10	13el	DL0OUD	704		
8	G1OGY	34128	48	123	01GR	75	14el	DB6DX	462		
9	G4YFN	28365	31	127	91MK	125	17el	FC1JHY	1357		
10	G8ZRE	26928	48	107	83NE	100	8XY	GM0FRT/P	408		
11	G8YGD	5400	27	44	91PF	50	8el	G4BZP/P	387		

SWL											
Posn	BRS	Pts	Multi	QSOs	Loc	Ant	Best DX	Km			
1	31976	11010	30	53	01HO	9el	G1JXX/P	442			
2	28198	9968	28	42	00HX	10el	GD4IOM	490			
3	62543	6534	27	34	83LT	12el	G8LNC/P	417			

Check logs received with thanks from G0CLP, GM1BVT, GW1ORA/P, G1YIY, G2FWX, G7AOU and PE1EWR.

CONTEST NEWS

G0LFF had a /P or not in the middle of his call sign. The adjudicator noted, by monitoring, his use of both versions so omitting /P on this occasion was not counted as a call sign error.

Scoring was accurate in all but one case, where the program could only cope with IO and JO fields; the distance between Clwyd and Jersey being calculated as over 700km! (the pretty way). It is worth pointing out that the potential for very long distance QSOs on 6m is greater than on other bands, so

make sure your scoring program can cope correctly with the unusual fields worked.

Congratulations to the overall winners, by a large margin, The Northern Lights CG who subject to Council approval will receive the Telford Trophy. Congratulations also to the winner of section 'F' Dale Harvey G3XBY and the winner of the SWL section, D Whitaker BRS25429. Commiserations to the runners-up, R Smith G0ERS and the Channel Islands ARCG GJ7DGJ/P, all of whom will receive certificates.

50MHZ TROPHY CONTEST 1989

SECTION 'F'						
Posn	Call sign	Pts	Mult	QSO	Loc	Best DX Km
1	G3XBY	94144	64	244	92DG	2223
2	G0ERS	81810	54	205	90KU	1669
3	G4BWP	68322	59	166	02FH	1855
4	G3JXN	62944	56	200	91UM	413
5	G8APB	43604	58	156	83WD	430
6	G3ZSS	40474	49	145	91TH	2053
7	G1YNR	30866	46	112	93ON	334
8	G4LDR	14098	38	57	91CD	371
9	G1NRM	13689	39	90	91UO	337
10	G3BOC	10329	33	50	82LT	398
11	G8DXC	7511	29	37	02DL	1870
12	G4HUP	6693	23	37	02PD	1855
13	G1NOD	3024	24	34	92MC	271
14	G1NMF	2466	18	24	01HN	1779
15	G6UJJ	520	10	10	94FV	317

SECTION 'O'						
Posn	Call sign	Pts	Mult	QSO	Loc	Best DX Km
1	G4UJS/P	310230	81	365	94RJ	1863
2	GJ7DGJ/P	156870	54	261	89WG	1483
3	GW4MGR/P	115709	67	190	73SG	1901
4	ZB2/P/G0LFF	108072	36	121	76HD	2121
5	GW4TTO/P	101432	62	214	82JS	1931
6	G0KPW	98400	50	227	02PA	2130
7	G4AUC/P	73935	53	185	80ST	1647
8	GW6XPO/P	44750	50	141	82JU	406
9	G1NUS/P	43420	52	153	83XF	2320
10	G3UAX/P	35144	46	110	80LW	1654
11	G4VIX/P	33930	45	112	01JW	1821
12	G4UXC/P	33005	41	109	03AH	1800
13	G1CSR	32095	49	131	91WL	1753
14	G4RFR	31812	44	111	90AS	1649
15	G8ORG/P	19184	44	84	93AD	1894
16	G3RRP/P	12740	39	72	83VV	1847
17	G3NTS	12740	33	53	91UM	1755
18	G6HLL/P	9273	33	53	83PF	1290

Disqualified: G4CAR rule 13
Check logs received with thanks from G8VER/P G4FRE

SWL SECTION						
Posn	BRS	Pts	Mult	QSO	Loc	Best DX Km
1	25429	26068	38	82	93FX	1817
2	52543	6931	29	38	83LT	2039
3	28198	180	5	4	00HX	1717

432MHZ LOW POWER CONTEST AUGUST 1989

Activity in this year's contest seemed quite high. The change to the single antenna rule apparently increased the number of entrants. However, many entrants commented that they would prefer to use more antennas. We could possibly include another section for next year for multiple arrays, and cancel the poorly supported and rather difficult FM Section. However, for this to be viable, pre-registration of section would be required.

Comments from entrants varied from a side of foolscap down to no comment at all. One group mentioned that under rule 16, they could not use their transistor linear. They agreed that this was a good idea to stop any cheating, but it did prevent them from using the built-in pre-amp. I can hardly believe that any pre-amp, placed immediately in front of any reasonable receiver, would make any difference - except maybe a resultant reduction in the dynamic range. So, come on everyone, mast head pre-amps are an essential aspect of 432MHz, if we are to work weak signals, and so advance communications on the higher bands,

as the experimental nature of our licence dictates.

The conditions varied widely for this contest: G4FKA/P reported on a lift before the contest, but this soon disappeared, and G1GEY picked up some good DX right at the end of the contest. However, the conditions were very flat overall. G3ZXX for G0KYW/P would have liked the event to have coincided with the French contest held on the Saturday. This was not possible since the calendar is decided in October for the following year (and neither the French nor anybody else tell us when their contests are to be run - G4DEZ). This is well before we hear about any non-coordinated continental contests.

Special congratulations go to G1GEY who won the fixed station section, and exceeded the leading portable score by a comfortable margin. Well done to G4FKA/P for winning the open section, and to G4PIQ and G0KYW/P who were the runners up in their categories. G1ATZ/P had a decisive win in the FM section with BRS 31976 the leading listener in that section. All these entrants will receive certificates.

G8TFI

CONTESTS CALENDAR

RSGB HF CONTESTS

6 Jan	7MHz LF Cumulative (Nov89)
7 Jan	3.5MHz LF Cumulative (Nov89)
8 Jan	1.8MHz LF Cumulative (Nov89)
13 Jan	3.5MHz LF Cumulative (Nov89)
14 Jan	AFS 3.5MHz (Oct89)
14 Jan	7MHz LF Cumulative (Nov89)
16 Jan	1.8MHz LF Cumulative (Nov89)
20 Jan	7MHz LF Cumulative (Nov89)
21 Jan	3.5MHz LF Cumulative (Nov89)
24 Jan	1.8MHz LF Cumulative (Nov89)
27 Jan	3.5MHz LF Cumulative (Nov89)
28 Jan	7MHz LF Cumulative (Nov89)
1 Feb	1.8MHz LF Cumulative (Nov89)
3 Feb	7MHz LF Cumulative (Nov89)
4 Feb	3.5MHz LF Cumulative (Nov89)
9 Feb	1.8MHz LF Cumulative (Nov89)
10 Feb	1st 1.8MHz Contest (Nov89)
24 Feb	7MHz CW Contest (Aug89)

RSGB VHF CONTESTS

3 Dec	144MHz Fixed/AFS/SWL
8 Dec	1/3/2/3GHz Cumulative (Oct89)
9 Dec	50MHz CW (Oct89)
10 Dec	70MHz CW (Oct89)
21 Jan	144MHz CW

28 Jan	70MHz Cumulatives
4 Feb	432MHz Fixed/AFS/SWL
11 Feb	70MHz Cumulatives
25 Feb	70MHz Cumulatives
3 Mar	144/432MHz
11 Mar	70MHz Cumulatives
25 Mar	70MHz Cumulative/Fixed/SWL
8 Apr	50MHz Trophy Fixed/Single/Multi
5 May	432MHz Trophy & SWL
5 May	434MHz to 24GHz
19,20 May	144MHz & SWL Single/All others
There will be an SWL section in every VHF contest even if not mentioned in rules	

OTHER CONTESTS

13 Jan	DYLC Mid-Winter Contest (Aug89)
First Tuesday each month	
144MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)	
First Thursday each month	
432MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)	
First Monday each month	
Microwave Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)	
Dates of publication of rules in RadCom are shown in parentheses	

432 MHZ LOW POWER

ALL OTHERS SECTION (MULTI OPS AND PORTABLES)						
Posn	Call sign	Loc	Score	QSO	Mult	Best DX Km
1	G4FKA/P	93AC	27150	100	51	-
2	G0KYW/P	81UC	22468	80	41	429
3	G3GQC/P	93EC	21164	89	44	328
4	G4KZY/P	82NN	20869	87	41	455
5	GW1ORA/P	82FT	19240	68	40	357
6	G0GJV/P	80ST	18791	65	43	463
7	G3UAX/P	91GI	16684	68	43	398
8	G8DDY/P	90HR	15732	60	38	469
9	G1SAS/P	02BA	14508	69	39	343
10	G6CTU/P	91XG	14280	65	40	366
11	G6ARC/P	92FM	13400	63	40	407
12	G6HLL/P	83PF	11704	56	38	446
13	G3GXU/P	93AD	11222	69	31	372
14	G3OLX	91VH	7685	51	29	413
15	G4SSD	80FJ	7125	39	25	373
16	G4NVA	83UF	6479	45	31	444
17	G3UBX/P	82RL	6474	53	26	288
18	G1DVU/P	94MJ	6384	28	24	449
19	G4CRA/P	01IT	6075	46	25	372
20	G6YLJ/P	91QT	4650	38	25	353
21	G8DCZ	90VW	4300	34	25	310
22	G4JS/P	83SQ	3950	40	25	311
23	G8BHD/P	80UU	3840	28	24	456
24	G4XOM/P	82UK	3588	38	23	283
25	GW8KOW/P	82JG	953	127	1	471

FIXED STATION (SINGLE OP)						
Posn	Call sign	Loc	Score	QSO	Mult	Best DX Km
1	G1GEY	94FW	29920	71	41	556
2	G4PIQ	01MU	24886	77	46	457
3	G1KDF	83NN	13104	50	39	484
4	G4ZFJ	01JN	10464	52	32	382
5	G0HAS	91BN	8547	43	33	436
6	G1WYC	92XT	7290	41	30	256
7	G1NOD	92MC	5910	39	30	317
8	G4DFI	01BL	5544	43	24	290
9	G1OGY	01GR	5225	37	25	322
10	G1HLT	93KD	5022	38	27	328
11	G5UM	92MP	1155	25	15	192
12	GW4HBK	81KP	952	12	14	278
13	G1NMF	01HN	876	15	12	274
14	G1SPU	82SP	855	17	15	237
15	G0EII	82OR	201	9	9	225
16	G3KZE	92VD	175	11	7	97
	PE1EWR	11SL	2940	19	14	475

FM SECTION						
Posn	Call sign	Loc	Score	QSO	Mult	Best DX Km
1	G1ATZ/P	93AD	1802	44	17	240
2	G7DDT	83XN	85	11	5	124
3	G8UUO	01FR	4	2	2	20

LISTENER SECTION						
Posn	BRS	Loc	Score	Heard	Mult	Best DX Km
1	31976	01HO	2641	27	19	324
2	32525	01AL	869	17	11	303
3	52543	83LT	852	17	12	305
4	28198	00HX	85	3	5	295

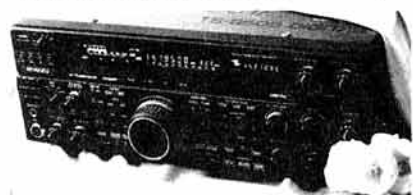
NEVADA.....TALK TO THE WORLD



TALK KENWOOD

We are now officially appointed Kenwood dealers for the South Coast — and carry the complete range in stock. Just arriving is the new Kenwood TS 950 HF Transceiver — we've had a sneak preview — and it's quite something. Call for details.

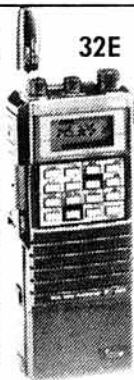
TX950 SD Digital HF Transceiver£3,199



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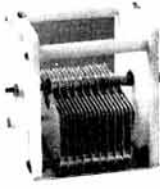
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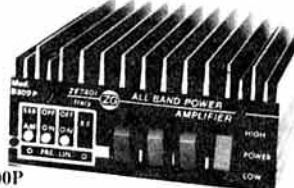
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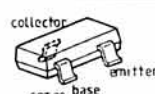
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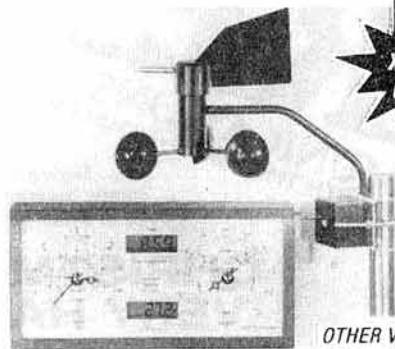
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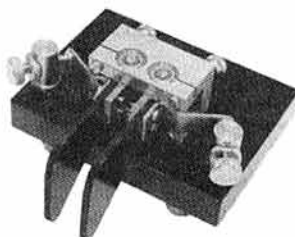


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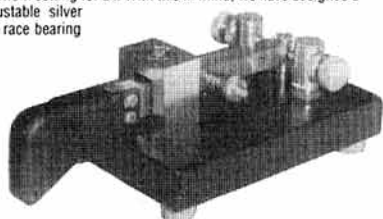
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With effect from the January 1990 issue, the rate for classified advertisements will be increased to 50p a word (43.48p + 6.52p VAT). This has been necessitated by the increase in production costs since the rate was last fixed three years ago in January 1987.

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Conditions of acceptance are published on the Members' Ad order form into the wrapper with every issue of *Radio Communication* posted to members. This form must be used when placing an advertisement; and please note that FOR SALE, WANTED and EXCHANGE advertisements must not be mixed on the same form. A new, more flexible, pricing scheme has been introduced. Details are on the form. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into.

FOR SALE

● YAESU FTV707 tvtr plus 2m and 6m modules. VGC: £260. Plus PP. G1NWU QTHR. (Market Harborough) 0858 880625

● FT101ZD with fan, CW filter, AM/FM, SP901 spkr, FV101, not DM, ext VFO, YD148 mic and all manuals: £480. No splits. Also FL2000B linear amp: £400. Clift, G3NDC QTHR. (Stammore) 01-954 1309

● APPLE II Europlus computer c/w 2 disk drives, printer and monitor. H/ware, s/ware packages inc Gibson light pen, 80col card with s/ware switch, Videoterm utilities, RS232 interface, 128k RAM, Merlin/Munchabug assembler package, numerous books and manuals. For sale as complete package. Offers around: £380. Clift, G3NDC QTHR. (Stammore) 01-954 1309

● TS303SP Kenwood all-band tvcr, 220W PEP, SSB, 180W CW, int powered. Almost brand new and hardly used: £550. 0304 366466 ansafone

● FT11RH as new, under warranty: £260.00. SEM Transmatch Ezilune, dummy load: £85. MMTR430144R tvtr rep/shift: £75. Carr.extra. QTHR. (Tamworth) 0827 57742

● ICOM 751, AT500 auto ATU, PS15 PSU gen.cov exc cond, boxes, manuals: £1300. Western peak reading wattmeter, to 2000W: £45. G4YYD. (Bury) 061-724 4218

● BBC-B with RTTY terminal unit and S/W. Side-ways RAM/ROM board, cassette recorder, 40T disk drive, colour monitor, quick sale: £275.00. SR9 2m RX with hb PSU: £30. Electronic Developments 2m linear with preamp: £65. 60MHz scope with manual: £200. Welz SP350 swr and pwr meter: £65. Digital multimeter: £25. GDDLF. (Northants) 0604 831061

● CLANDESTINE radio B2, 3MkII TX, inc coils, RX, PSU, sorry no other ancillaries: £150. A16 c/w H/S mouse unit, mint, £200. A510 complete, boxed, mint: £125. Also FT290R m/mount, chgr, magmount, 1/4wave mobile ant, nicads, Rig well used, but works well: £225. R210, unimp, and R209 cheap to clear: £25ea. Kemp, G4TMD not QTHR. (Hastings) 0424 751531

● FDK750XX 2m multimode 1/20W output c/w bracket etc. In orig.carton. Well cared for: £225. GOLRY. (Wisbech) 0945 63842

● KW202 rcvr c/w manual and spkr: £100. (Bristol) 0272 563023

● ICOM IC551 6m basestation, VGC c/w mic, manual and orig packing: £450 inc post. GW3WSU QTHR. (Barry) 04468 261

● PYE FM Westminsters low band: £30. UHF: £30. Scope 15MHz dual beam: £95. Audio generator: £18. Phones: £2. AC10 PSU: £20. Manuals for Tektronix, Telegon, Marconi, Advance etc. Various components etc PF70 bat tester: £5. G4YYJ QTHR. (S. Somerset) 050785 203

● IC251E tvtr with Mutek: £425. 60t winch over tower. With winches, cables, lead unit. Galvanised: £350. G6YAS not QTHR. (Hull) 0964 613928

● TOKYO Hi-power HT 180 80m tvtr. 20W mobile or home base digital readout. Immac: £225. G0IMD not QTHR. (Hartlepool) 0429 863453

● HITACHI colour camera, Satcon tube type VK600. Portable matching VHS recorder, padded carry case, 2 new nicads type VT6500E. Matching turner/timer, PSU, chgr type VTTV65E. All recently serviced. Ideal. ATV: £350 or might exch dual mobile GOANX QTHR. (Oxon) 0235 87498

● YAESU FT211RH 5W/45W FM mobile. Orig packing and manual: £215. Dewsbury Star Masterkey memory keyer: £60. Hi-mount MK706 paddle key: £20. Can deliver Birmingham or Exeter areas or plus car. Peter Martin G4SDK. (Exeter) 0392 64034 w/day eve only

● BENCHER paddle. Exc cond: £48. Star Masterkey MkII electronic keyer: £40. Post extra. G6V5 QTHR. (Liverpool) 051-733 6415

● TEMPO 2004A. £105.00. Matthew. G6KOA QTHR. (Birmingham) 021-458 1941

● MOBILE radio station. Ideal club activities. Converted large bodied Leyland ambulance. Double skinned insulated fibreglass body. Negative earth dual batts. Ample gear and operating space 3ft clear down centre. No fittings above waist height. No problems swinging the cat! Fitted sink, hotplates, oven, fridge, water supply, toilet. Recent complete overhaul to front axle and brakes. Carry 7 passengers. MOT June 1990. Taxed Feb 1990. Private light goods: £1650.00. Ron G4OFJ. 0453 545301

I KENWOOD TH215E with PB2 pwr pack, chgr, rubber duck, telescopic ant. gutter mount: £180.00. G0HAZ. (Mullion, Cornwall) 0326 241044

● TRIO TS830S, remote VFO, CW alt: £750. Heathkit SB220, pwr meter: £650. TL922: £950. Racal RA1217, 5 filters, superb: £250. Heavy duty Versatower 60t BP60-16M with Emoto 502 rotator and bearing: £650. Heavy duty rotator TX: £275. Bencher keyer: £30. (Cheshire) 0565 873205

● AR40 rotator, medium duty, c/w approx 40ft cable: £550.00. Dawda AF606K all-mode active audio filter: £50. FC707 ATU: £75. No exch. (Midway) 0634 30822

● TS940S: £1600. FT225D: £500. TS700G: £250. R216: £60. MML432/144R: £90. TVV50C: £200. YD844: £20. Buyer collects. G3WQM QTHR. (York) 0904 793672

● TEN-TEC Corsair model 560 plus PSU model 260 and manuals. Perfect cond: £675. G3UFZ QTHR. (Brixham) 0803 845304

● TH3JR: £50. 3ele 6m beam: £12. Scope Telegon S54A: £70. Creed B7 ST5: £20. PS13.5V/27A: £15. Spectrum tvtr 6m: £30. AR40 rotator: £25. Sinclair PDM35 meter: £15. Trap dipole: £15. Multimeter 680R: £20. Tubular mast 50ft rigging, stakes: £30. G4FFK. (Petersfield) 0730 87391

● TEN-TEC Argosy 2 fitted with 500Hz xtal filter, audio filter, and noise blanker. With mic and circuit breaker switch. VGC: £500.00. G4RHR QTHR. (Ipswich) 03948 654

● APPROX 50 Sony V60H prof video tapes, some unused. Offers. Tektronix dual beam scope type 502: £450.00. Advance sig gen 15Hz-50kHz, type H1: £20. Marconi sig gen, 10-310MHz, type FT801A: £25. Vignoles Megger. Offers. Brass sheet 48x24x1/16in: £10. Ideal modelmaker. G3UJX QTHR. (Medway) 0634 250562

● YAESU FRG7, boxed, mint cond. Unmodified: £125. FRT7700 ATU, boxed. As new: £30. Realistic PRO2002 scanner, boxed: £125. Also Amstrad CB900 prof cvid to 10m: £30. Selling to make room for HF tvcr. Buyer collects. G0JYQ QTHR. (Southampton) 0489 577033

● DRAKE TR7 with DR7, PS7. Service manual, exc cond. V. little use: £750.00. Buyer collects. G4AP QTHR. (Kingsbridge) 0548 531474

● PK232 TNC c/w manuals, leads and box. VGC: £185. Carr. extra. Will swap with FT767 6m/70cm module. G7AGM. (Exeter) 0392 432675

● TR200G fully xtalld: £35. Stollie multiratic rotator: £25. 2m 4ower4 slot led ant: £7. G4DEV. (Worcester) 0905 51805

● YAESU FT203 h/held. FNB3, chgr, case, m/bracket, YH2 headset. All boxed and mint cond: £145. G4RPA QTHR. (Bognor Regis) 0243 862629

● WESTERN Electronics ultimast. 30ft tiltover telescopic tubular mast. Will need new ground post as present one set in concrete: £120. Mast currently carries TH42 triband HF yagi. Beam and rotator available by separate negotiation. G3PEK QTHR. (Chester) 0244 300897

● ICOM IC32E dual-band h/held: £300. Also WX1 dual-band ant: £30. Both items as new. G1ZJU. 091-567 2130

● PAC-COMM Tiny-2 packet module with cables for FT290. £75. Sony IC7600D LW/MW/SW synth RX: £75. G3XTQ QTHR. 0525 240281

● IC900 brand new. Unwanted raffle win. Module for 2m and marine bands, 45W. £600. G3NDO. 0705 465121

● YAESU FT980, Yaesu SP980, Yaesu FT736 with 2.70.6. Yaesu FT726 with 2.70.10. Nye Viking King 10t, 10m module 726, heavy duty mobile mast 70t TH3 Mk3 beam. Kenpro 600 rotator. 30A BNOS PSU 200W MM 2m linear. Offers. All equip unmarked. mint. G4PDW. (Grimbsy) 0472 70125

● 2m multimode FDK multi 750E 10W SSB-CW FM c/w matching PSU PS750, 150 mic m/bracket, stand. Both items mint and not used mobile: £260. Also Vibroplex deluxe chrome imbec paddle. Mint: £65. Carr. extra. lan. GOAYN not QTHR. 0782 331853

● YAESU rcvr FRG7700 and tuner FRT7700. In as new cond: £250. G7BVN QTHR. (nr. Colchester) 0206 262765

● TS830S plus ext VFO. 1st class cond: £800. Also Icom IC735, 1yr old. Practically unused. Both with orig packing and manuals. GM4WZY. (Grangemouth) 0324 483299

● MEON 50MHz tvtr, 2m IF. 15W output. Extremely well made. VGC. Works well: £70. G1HEW QTHR. (Workop) 0909 565443

● 23CM PA2X2C39 cavity never been used, made from solid brass, very high quality. No tubes or PSU: £150 or same in D-Marks or HFL. No phone

callers. GW8VHI. Reg Woolley. 431MU. RAF Bruggen, BFPO 25, West Germany.

● TEN-TEC Century 22 HF CW TX/RX, 3mths old, mint cond: £275. Morrison. 0952 291514 day

● PROPERTY of the late CE Sutton, G3AQ. KW Vanguard Datong D-75 speech processor MM432/50 and 144/100 pwr amps. Azden PCS3000, Tr1R2300 and TR7730 2m FM tvcr. Icom IC202S Uniden 2000 HF tvcr, Codar AT5 plus PSU. Also several PSUs and swr meters. Nigel. G4KZZ QTHR. (Coventry) 0203 44160

● COMMODORE bits. Disposal of surplus Commodore 1520 plotter/printer. VGC but no box: £20. Cockable disk box with 55 assorted disks, most with prog, some unused: £15. John. (London) 01-857 8096 after 11am

● YAESU FT726R inc satellite module, 70cm/2m: £775. Hansen FS7 swr/pwr meter 144/432: £30. Sota 432 linear amp 25/30W: £35. G4BD QTHR. (Rotherham) 0709 379095 day

● AKAI GXF80 cassette deck, 3-head, GWO: £75. Dree 3-way ant switch: £5. Pihong 7A PSU, needs new transformer: £5. 2m 1/4wave magmount: £5. 70cm Revco magmount: £5. Small dual-band whip, 259 base: £5. 70cm HB9CV: £5. G4OHB QTHR. (Birmingham) 01-429 3530

● YAESU FT726R 2m 70cm satellite units c/w MD188 mic: £700.00. Genuine sale. G1XCD QTHR. (Workop) 0909 477565

● ST6 terminal unit with Creed 444 I/P, 231hrs use, and electric power winder: £80. Marconi TF801B sig gen: £50. G3TGF QTHR. (Heathfield) 0435 830484

● FT290R mic, chgr, rotator, 30ft each cable and feeder. Lot: £300 plus carr. G2FYG QTHR. (Derby) 0332 764518

● COLLINS 7551. Yaesu FL2100Z linear, WARC, FR101, FL101 will TX. Bencher BY1 Vibrolux iambic keyer. All mint cond. G4LWQTHR. (Trowbridge) 0225 753166

● COMMODORE 8032 computer plus 30/40 DD drive with cable: £200. 2031 drive: £50. Buyer collects. G2PA QTHR. (St. Albans) 0727 55128

● FT290R 2m multimode, c/w nicads, chgr, case and m/mount: £240. TR2300 2m FM portable c/w nicads, chgr: £90. Terry G4OXD. (Hitchin) 0462 435248

● STANDARD C7800 10W 70cm mobile. Memores scan with Heatherlite mobile. Mic with remote channel change. All as new: £160. G0ANX. (Wantage) 023587 498

● W600 amp. New elec. New 572B. Perfect WO. Clean, unscratched. Legal limit for: £225. Any test. Trio SM220 scope inc BS8 nan display. Immac: £285. Kenwood HC10. World clock. Immac: £75. Prices inc carr. G3RHM QTHR. (W. London) 01-423 23123

● TRIO TS711E, 2m multimode, manual, mic, 12V lead, exc cond: £550.00. Datong PC1. up c/vtr: £70. John. G6AZV QTHR. (Poole) 0202 602362

● ICOM IC471E 70cm 25W multimode basestation. Little used: £390. G6OKB QTHR. (Thanet) 0843 821260

● HO1 min beam with matching ballun transformer: £70. DR7500 rotator with preset controller: £80. DR7500 rotator with round controller: £70. (Nottingham) 0602 396328

● GOING ORP! Perfect Trio 530S with 1.8kHz SSB filter. Only: £545. MC50 deskmic: £25. Digital remote VFO DFC230: £35. Daiwa CN620A pwr meter: £45. Philips scope dual beam 10MHz, manual, probes: £75. Pye Cambridge, boot mount, lowband AM: £12. Sme Transmatch 160m: £78. Maplin video enhancer: £12. Nigel. G4PJJ QTHR. (Gloucester) 0452 75542

● YAESU FT101E HF tvcr. Exc cond. New PA valves c/w w/shop manual: £270. G0IVM QTHR. (Worthing) 0903 693125

● 24FT pneumatic Clark mast, 4-section: £180.00. FT727 dual band handle: £240.00. G4NJU QTHR. (Milton Keynes) 0908 378277

● KOK FM2025 2m 25W: £120. Thick wall all poles 13ft, 2in O.D. and 13/4in O.D.: £12ea. Sky King SU4000 rotator, cables: £100. 2m 5/8wave magmount: £10. HAG 2m 7ele yagi: £10. G4FSI QTHR. (Farnham) 0252 715218

● INTERNATIONAL frequency list on micro-fiche with Agfa-Gevaert full size viewing screen, TV size, 48times magnification. 6mths old, hardly used, still in box. Cost over £600. Will accept: £190 for quick sale. GOGGD. (Co. Durham) 0325 466016

● PK232 Pakrat multimode data controller: £150. Kenwood R600 comm rcvr: £200.00. Icom UHF tvcr IC30A: £25. Yaesu FT208 VHF hand portable plus NC8 desktop chgr plus mobile headset and cigar pwr source: £110.00. 144MHz linear: £50.

FT209 plus car adaptor, headset and magmount: £110. MX7000 scanner 25MHz to 1.3GHz: £100.00. Mono video camera: £25. Video sender: £15. Sinclair Microvision TV: £25 or the lot: £700 cash or cleared cheque. G4JLI. (Congleton, Cheshire) 0260 276496

● TRIO TS780 multimode mains and batt leads up down, mic, 10mm, orig. boxes: £700. G1LHW QTHR. (Wimborne, Dorset) 0202 694322

● FT290R, MM 30W linear, 5ele beam, 12ft pole: £300. 12V 5A PSU. Buyer collects. (Cambridge) 0223 67395

● PHILIPS D2999 world rcvr 150-3000kHz plus FM broadcast 16mm ch BFO. As new: £75. Philips DB278 radio recorder high-speed dubbing LW/MW/SW/FM, detachable spkrs. As new: £50. (Berkhamsted) 0442 862814

● KENWOOD TS680S tvcr, hardly used: £750. FC102 ATU plus FAS14R: £200. Daiwa electronic keyer and paddle: £50. TS805 plus AT230. Boxed, mint cond, dummy load and other extras: £850. Paila sch due. Going QRT. Evans. (nr Bristol) 0454 327429

● YAESU FTONE, mint, boxed, 4mths old with CW filter plus SP980 matching spkr and MH1 mic. Cost over £1500. Bargain at: £995. May take cheap TX/RX or Swan eqn in pt exch. Chris. G0LGL QTHR. (Holbeach) 0406 25398

● KW107 Supermatch ATU dummy load swr/pwr meter open wire coax connections: £85.00. G4VIV. (Upminster) 04024 45199 eve-w/e

● C4 HF ant. No radials req'd. 6/10/15/20m. As new: £45. G4GKN. (Bristol) 0272 833572

● HEATHKIT RA1 amateur bands rcvr. GWO: £30. Collect or split carr. John Carver QTHR. 0224 368647 eve

● FT101E spare PAs DC lead fan, YC601 digital display for FT101E. Kenwood AT200 ATU. VGC: £385. G4ZUX QTHR. (Weston-S-Mare) 0934 512141

● SPECTRUM 3, PSU, joystick, TX3 s/ware, RTTY/CW/ASCII. Disk, adaptor, TIF interface. Hissolt fast basic compiler, 5 disks with some programs, exc cond. ZX81 computer, PSU, Needs recorder leads. All fully documented. Bargain at: £200.00 the lot plus post. G0EBV QTHR. (Chester-le-Street) 091-388 6057

● TS520 c/w h/bk. MC35S mic and set of spare PAs, driver: £200. Collectors item. R109 wartime RC c/w 6V car batt. Old service phones. Few spare valves and 19bat Vanometer ATU. Photocopy h/bk. Prefer collect. Peter, works QTH. (Cleveland) 0287 34397

● FT411 2m h/held CWDC tvtr. PA6 spkr mic. Mint cond: £215. Alinc AR22E 2m 130-174: £185. G4SLG QTHR. (Lincoln) 0522 751920

● YAESU FT902MD g52 cond: £550. Yaesu FL210B: £350. VGC. Worked lots of DX. Jeff, G4SOF QTHR. (Bideford, Devon) 0237 472282

● ICOM IC740 with int PSU, FM CW narrow filter, manual, boxed, serviced Icom UK and 88. Used only for VHF net: £550. AT230 ant tuner: £150. Pair: £675. Single 4CX250B amp: £215. Mike GOKS. (Epsom) 0372 742476

● TRIO R600 rcvr, 150kHz-30MHz AM/SSB/CW. As new: £145. G4JPO QTHR. (Stowmarket) 0449 613870

● QRT sale. Icom 735 with AHZA auto ATU and Homebrew 25A PSU: £500. Trio TS711E 2m tvcr: £400. FRG7 rcvr: £100. Hameg 705 scope 75MHz bandwidth: £200. Altron 30ft telescopic mast, wall bracket, rotator, 7ele 2m beam: £150. Buyer to dismantle. Prefer buyer to collect if poss. G3AAH QTHR. (Birmingham) 021-451 3369

● YAESU FT690 Mk2, nicads, chgr, case, manual: £295. Jaybeam 4Y/6m c/w 10m URG7: £275. Post extra. G6NGA. (Bishops Cleeve) 0229 658516 7-9pm

● CAPCO SP300 ATU for sale: £125. Drake WH7 wattmeter swr 2k: £70. GOMGY ex G1TDE QTHR. (Stoke-on-Trent) 0782 317042

● TELEQUIPMENT D43 double beam scope, 15MHz bandwidth. GWO: £60. Buyer collects/in-specs please. G0GCM QTHR. (Ellesmere Port) 051-355 9325

● STANDARD C500E 144/430MHz CNBN1 nicad and chgr: £285. Hardly used in orig boxes. Colin G7BLD. (Gainsborough, Lincs) 0427 810326

● FT757GX, FC757AT, HDPSU, MH188 hand mic: £820.00. FTV107R for use with above: £100.00. AST rampage board for IBM XT with 1.25Mb mem fitted: £250.00. Osborne Executive c/w 10Mb hard disk and loads of s/ware: £250.00. Mono colour Apple IIE plus many extras: £150.00. Printer buffer, parallel, 64k mem fitted: £50.00. Icom IC260E c/w m/mount and mic: £150.00.

Tektronix 465 scope, mint: £600.00. Malden 754 sig. gen. dig. 100kHz-118MHz: £300.00. Diabolo 30 clone, daisywheel printer: £50.00. Datong speech proc. Offers. Daiwa 7500 plus 7011 rotor and ctrl. new. Offers. Sale for mortgage! G8PFR. (High Wycombe) 0494 816342

● MARCONI CR1000 rcvr, Admiralty B28, fair cond., with service manual: £25. G8KDU QTHR. (Hemel Hempstead) 0272 367270

● TS830S MC35S mic and spare valves. 500Hz filter. Exc. cond. £650. Cash only. Buyer collects. G0DJW. (Beccles, Suffolk) 0502 715419

● QRT sale. Trio HF tcvr 120S ATU. PS30 ext spkr: £300. Homebrew lin amp pwr 5kV valves. As new. Suit lin amp etc. Freq counter and AT matcher. Misc oddsends. G0FWT. (Sheffield) 0742 420895

● COMMODORE C128 computer 1570 disk drive 1525 printer. C2N cassette mono monitor plus books and many programs. BNOS 100W 70cm linear 10W input preamp: £190. Computer: £350. G4NTY QTHR. 061-790 7673

● SELL ATU RX only. MW to 30 meg. Unused, unwanted gift. Bring those signals out of noise: £25 plus post. G7AIR. (Rochdale) 0706 218290

● G8OON. FT290. £255. 2x TH21E. £120. 2x TH41E. £135. MMT432/144R. £90. Apricot 10Mb MSDOS 2.11. £395. 6m Meon tvt: £50. MX80 F/T printer: £85. (Portsmouth) 0705 815616

● KENWOOD TR7500 145 146MHz. Ioneburst mobile plus homebase mounts. Boxed etc: £80. (Warminster) 0985 50455

● VIBROFLEX org standard mechanical bug key, exc. cond. Still boxed, little used. Perfect: £40. (Broadstairs) 0303 58316

● KW Ezematch ATU: £16 plus PP. N1700 video recorder. w/ship manual: £4 plus PP. G5PW QTHR. 0274 875566

● STANDARD C58 2m h/hold, property of the late G4WMM: £250.00. Vivien Healey. (Yeovil) 0935 21246

● TRIO 9R-59DS gen. cov. RX. B'spread on amateur bands. Pristine cond. as new. £50. G3TOK QTHR. (Beckenham) 01-777 3134

● VALVES ECC91/6J6, EF8, U33, U191, 5U4G, 6AS7G, 6BS7, 6BX7GT, 6F33, 6L6G, 6BG7, 6SC7, 6XSGT, 12E1, 807. AC/ME valve tuning indicator for AC powered RXs. All valves are boxed as new and half RRP. Screened ceramic base valve holders B7G base: £50/each. Stereo service manuals. Fixed station models CQL611-4, CQL611-4F, portable models CQP611-4, mobile models CQM611-4, personnel models CQP511-4. All above cover 146-174MHz. Portable model CQP683 420-470MHz: £7.50/ea. Teletype equipment service manuals type 52. DM64: £3.50/ea. Piper Comm LT235 2m IF, 23cm high performance tvt fitted with high stability option, mint: £315.00. 50m 16swg enamelled copper wire: £5 plus PP. G4WUS QTHR. (Guisborough) 0287 42596

● FT902DM tcvr, WARC. FM filter AC/DC. FC902 ATU. SP901 spkr: £525. DL6000 dummy load 200W: £30. Icom R70 tcvr FM CW filter, AT1000 ATU, 2m tcvr, 5-way coax ant switch: £390. Datong FL3 audio notch filter: £60. G8NT QTHR. (Suffolk) 0728 830791

● RCVR National HRO500 gen. cov. Electronically OK but requires attn to mechanical tuning mechanism. Hence only: £65. Amstrad CPC6128 mono home computer. Serious pros, games and books. Works well: £150. Buyer collects. Cane, G4KRH QTHR. (Billerica) 0277 658582

● FT690 Mk11, as new, boxed with all accs, inc FL6020 linear, Forced to sell at bargain: £350. G1UQA. (Ilford) 01-550 2502

● VIC 20 complete. Ideal RTTY etc: £50. AMTOR/RTTY Epram programmed for your own callsign available. G3WAR QTHR. (Swanage) 0929 423337

● TS830S. Good cond. Deluxe knob, little used: £650. Also 19set rotary PSU nr1 Mk1 and complete vols issue 1 to 1989 of Radio and Electronics World mags. Offers. Bruce Morris. GW4XFF QTHR. (Tywyn) 0654 710741

● YAESU FT2700RH 2m/70cm tcvr with fitted voice synth: £385. YAESU FT230 25W FM tcvr: £195. G6HRC QTHR. (Worthing) 0903 830434

● FC102 matcher 2m swr and RMS/Peak. 1200W PEP. Coax or Iwire. Boxed with manual. Exc. cond. £180 collected. Max. G3WMB QTHR. (Ware) 0920 463564

● STORNO COM 614 base. VGC cw duplexer high band: £200. Icom IC1050 10m FM: £30. Dymar Lynx high band FM mobile 6ch: £15. Marconi TF2300 mod meter. GWO: £90. Versatower P60 60ft wind-up tower, mounting post: £350. Bird Terline wattmeter: £75. Would exch any of above for interesting pre-1970 car, van etc. G4AJE. (Cambs) 0354 741168

● YAESU FL50B, FR50B combination. Ideal first HF rig. GWO: £120.00. G4KAU QTHR. (Norwich) 0603 603493

● BOOKS. Newnes Complete Wireless 1936. 4 leatherbound vols: £15. Admiralty h/boks Vol 1 and 2 1938: £6. Core Basic Electronics. 6 books: £25. Core Basic Electronic Circuits. 2 books: £2. (Pent) 0738 26941

● PENTAX outfit. 1S1A 55mm, 35mm P/S, 135mm P/S. VGC inc sales. All for: £100. TR9130. VGC: £350. G4FAS QTHR. (Stockport) 061-437 7784

● ZENITH Royal 7000, soft case, handle, scratched, orig log, no manual, mains cord. Available Harrogate. Best offer secures. Aled, 9 ave Fr. Mistral. 06130 Grasse, France.

● YAESU FL2100Z: £600. New Shure 526T pwr mic: £65. G3LBG QTHR. (Torquay) 0803 313318

● YAESU 290R 2m tcvr. Mulek F/E, nicads, chgr, mic, carrying case, h/bok. New cond: £230. G3FJ. (Waterloo) 0705 252442

● YAESU FT290R Mk2. Brand new. Still in box. New nicads. Cost new £429. Will sell: £325. Kenpro rotator, looks new, but controller needs attn, hence only: £80. Model KR500RC. G1REG. (Morden, Surrey) 01-540 3959

● KENWOOD R1000 comm RX, slight scratches on case otherwise OK: £200. G3RAE QTHR. (Beccles) 0502 712129

● EARN money. M4 ultraviolet photogaze oven, pictures on plates. Mint: £375. Can deliver or exch for AOR2001 RX or good HF RX/TX or 50MHz multimode or WHY. GW1SSQ on 2m. (Pontypool) 04955 57221

● TRIO DFC230 digital freq controller for TS120V and TS130S/830S. Boxed, new and unused with manual: £125.00. (Aldridge) 0922 57833 after 7pm

● TRIO/KENWOOD service manuals TS770, TS830S, R2000. £8ea inc post. G3JHP QTHR. (Horley) 0293 774303

● YAESU FT101Z VGC. 6-bands CW narrow filter, fan, mic, manual: £340. GW6RWP QTHR. (Rhonda) 0443 775949

● FT780R, FT780R 70cm multimode TX/RX. 10W, 12VDC, one owner from new, no mods, mint cond: £295.00. G8HWZ. (Atherstone) 0827 872171 after 6pm

● G6JYbeam, 4ele aerial, as new: £25. (Sudbury) 0787 73238

● DRAKE TR4NB HF tcvr remote VFO, mains pwr unit, spare valves, manuals: £340. 10m multimode tcvr AM/FM/SSB/CW. circuit: £90. Eddystone rcvr 7700U/2 150-500MHz 6 ranges AM/FM. manual: £85. Singer Graflex 16mm projector optical sound slot loading 250W QH amp. Solid state amp, single case, built-in spkrs: £100. Pye Scalap Galvo: £10. G4ULR QTHR. (Norwich) 0603 51566

● EME23150. German, 23cm 150W plus valve linear amp. New, unused: £275. C239BA valves, new: £50a. 1500W HT PSU inc toroidal transformer: £62. Philips 8833 14in colour monitor RGB/TTL/composite: £150. Paul, G4XHF QTHR. (Crawley, Sussex) 0293 515201 eve

● TS530SP HF tcvr 160 10MHz inc WARC. 2.5yrs old MC35 mic, manual, box, spare PA valves. Exc. cond: £650.00. G4MWP QTHR. (Coventry) 0203 462035

● F2100Z linear, little used, hence sale. One owner from new. Purchaser collect preferred: £450. G4KRQ QTHR. (Salsbury) 0722 29737

● JAPAN Radio complete set JST125D tcvr NBD500 PSU and NFG220 4hrs auto ant tuner. All in mint cond. No more than fully use. Boxed and with manuals, docs: £1200. Sold because impossible to erect ant. (London) 01-828 4755 6-10pm

● LAFAYETTE HA250 RX 0.30MHz unmarked USB/LSD/CW. Perfect. Offers. FRG7 comm RX 0.30MHz: £115. R1000 comm RX 0.30MHz: £200. YAESU 720RVH tcvr FM 25W: £120. 144-145MHz. Icom 490E 70cm tcvr. All mode: £400. Linear amps. MM144/50S 10W in, 50W out: £80. MML432/50 10W in, 50W out: £110. PSUs. Welz RS455 3-15VAR 3.5A: £35. Welz RS655 VA meters 3-15VAR 6.5A: £45. Pihonig PP137 13.8V 9A: £30. FK1 Brit, made 5A 13.8V: £20. SMCRO12-04-06 regulated 13.8V 6A: £25. Beams, new 2m tonnes: £35. 5ele 2m FXD or P: £25. 2m 8ele F or P: £30. Books approx 50 starting J. Scott-Taggart 1923. Approx 250 new valves. All types. Send for lists. Best offer for valves/books. G4IAV. (Atherton) 0942 870954

● ATV 24cm equip 24cm transmitter tcvr and 15W linear. MS7762 pwr mod, cw video monitor. 542. Fortop 70cm ATU tcvr SW: £80.00. 5in VEEA 542 model: £25. 90-960MHz to 425-455MHz RX tcvr. BNC 12V: £50. E934-935 converts to 429-430MHz. 2 mini cassette recorders as new. 1 with slight fault: £450.00. MCGO tapes. Chris, G1EJZ QTHR. (Stoke-on-Trent) 0782 46570

● YAESU FT101ZD, exc. cond, little used: £425. G0EHK. 0772 814200 eve-w/e

● YAESU FT290R, tonna beam, Zetagi B40. Slimjim. Swr meter. Mag mounted whet: £290 the lot. G0HYZ QTHR. (Gosport) 0705 585366

● TRIO 520SE plus AT200 ATU. VGC: £400. FV107R 2m with FRB707: £150. Sony 2001D, boxed, mint: £175. AIR7: £120. National 190 GC RX: £65. Heath HD1250 dipmeter: £40. Fluke 8060 digital meter. Cost £250. Swap late 2m h/hold FR17700 RX ATU: £30. Drake WH7, mint: £50. Lars Omnimatch: £25. American Vomag split band speech processor: £50. Tristar 777 multimode C13, new cond, ideal for 10m conversion: £85. Cubic 103 superb American tcvr matching PSU: £800. All plus post or collect. (London) 01-534 3460

● MML144/100S 2m 100W linear: £95. MMT432/285 70cm tvt: £90.00. Local delivery otherwise buyer collects. G8GKH QTHR. (Cheltenham) 0242 230218 eve

● DUAL band multimode. Trio TS780 2m/70cm. Good cond 12/240 leads. Orig boxed: £650. Bob. G6QUA not QTHR. (Luton) 0582 422297

● ON behalf of silent key, brand new, boxed TS140S, PS430, mic. Receipts. Lowe warranty: £850.00 plus delivery. Hamilton, Hallsland, Hardgate, Clydebank. (Dunlocher) 0389 73740

● ICOM 551 dedicated 6m tcvr. Absolutely mint cond. Boxed with inst manual. Built-in 240VAC PSU. Also 13.8VDC operation. Pass-band tuning

unit incorporated. List £130. Twin VFOs scanning facilities, c/w mic and accs. As new. Rarely advertised: £495 complete. No offers please. G2FZU QTHR. (Southwell, Notts) 0636 813847

● IBM bits and pieces. CT EMS card, fully populated with 2Mb: £250. Paradise EGA card with 256k: £85. AT RAM card with SIMM sockets. No RAM: £30. XT serial card: £18. All items working. G6JNS QTHR. (Worcester) 0905 620041 24hr accessible

● TRIO 7200G 2m FM mobile 10W/1W 22ch fully xtal'ed c/w m/bracket and manual. Good cond: £100. G6M7KL QTHR. (Edinburgh) 031-441 1597

● TR2500 2m FM h/hold tcvr c/w soft case, spkr/mic, nicads, dry cell case: £140.00. Also FTV107R tvt shell, no modules: £35.00. Steve, G0KJO not QTHR. (Leeds) 0532 756718 ask for Room 51

● RACAL 17L comm rcvr 500KC-30MHz GWO c/w manual: £100. Also fully FT401: £50. (Bolton) 0204 392206

● STANDARD C8900 2m FM tcvr, 10W, box, manual: £120. Bremi 3A PSU: £10. Lightweight rotator, 2m 5ele yag: £20. G0CZB. (Hitchin) 0462 345552

● GEC BRT400 RX. Lafayette HE80 RX. YAESU FR101 band switch new 2x 1930s broadcast RX. All above or WHY J. Wright, 54 Queen Mary Ave. Basingstoke, RG21 2PG

● ALTRON AT42, 3yrs old with new ground post. Max height 44ft: £350. G4ZEK. (Colchester) 0206 851343

● H/IELDS. IC2E, spare batt: £135. FT708R. 70cm, m/mount: £150. Both with additional real leather case, spkr/mic, chgrs, org packing. Remedy HX2000 scanner. 20ch. 60-795MHz. AM/FM, nicads, chgr, org packing: £125. G8PRR. (N. London) 01 370 4139

● KW2000B, KW mains PSU, KW 12VDC PSU, KW50 5er. H/bok full size cir diag: £220. TH3jr 3ele beam: £90. Datong morse trainer: £35. Acorn electron Acorn PSU, manual: £40. 24VDC portable gen. 600W Villiers 120cc C12 engine, propane fuelled ideal field events. H/bok: £85. Colour video camera. Hitachi VKC750E zoom. Ideal ATV station: £40. Matching Hitachi slit video recorder could be available. Whole outfit: £300. ITT electronic teleprinter 2300S. Exc. cond: £80. 0328 710085

● ICOM IC240 2m FM mobile tcvr: £100. BNOS 50W 2m linear: £60. An ideal pair, mobile or packet. G4AEZ QTHR. (London) 01-360 7100 eve

● TS930S, mint cond, tx/tx, FM fitted, YK88A, YK88C filters, fast TX/RX for AMTOR. Mallock serviced: £1250. G4PKH QTHR. (Berkhamstead) 0442 864059

● HQ1 mini beam HF aerial: £100. AR40 rotator: £40 and offers for German wartime mobile Fuesch A tcvr, D1019 and Seva rotary cvtv, D1028 with manual. G4LOD QTHR. (Weybridge) 0932 854393

● KW Vanguard c. 1956 AM/CW 50W TX 160-10m: £40. TSV120V HF tcvr 10W 80-10m: £275. 2x Jaybeam 144MHz 10XY beams with pwr splitter: £80. KR500 elevation rotator with controller: £100. Spectrum 128 plus microdrive, s/ware: £120. Gerwald, G0GNE QTHR. (Leamington Spa) 0926 613669

● SHACK clearance. Shimizu SS105S TX/RX SSB, FM, HF, mobile or fixed. All options fitted. GWO: £200. Drake R4C RX: £350. HF linear amp 4-1000A tube. Plus 1 brand new spare tube. V large separate PSU on castors. V tidy unit. Extremely potent in pile up s: POA. Test gear. Airmex modulation meter type 409, clean and GWO: £50. Marconi sig gen type FT995A/4 1.5-220MHz, clean and GWO: £50. Nombrex sig gen type 31, clean and GWO: £10. Various large QRO EHT transformers from 3000V to 4500V and up to 1.5A. POA. No time wastes please. G4HSD. (Middlesbrough) 0642 816608

● BBC-B computer. 13 tapes of insts and progs. 12 books on progs. Offers for all or part considered. G4FML QTHR. (Woking) 0276 858404

● YAESU FT736 latest 2m/70cm dual-band multimode, 25W tcvr. Mint, boxed: £1095. Trio SM220 station monitor scope. As new: £275. G4IOF QTHR. 01-722 7040

● FT707, FC707, FP707: £525. Alenco ALR22HE 45W 2m mobile, hardly used: £230. YAESU FT290R helical whet, chgr, nicads: £275. Tono 2m 40G linear: £65. Blackstar Meteor 600 freq counter: £90. Tektronix 545B scope c/w dual-trace plug-in unit: £85. G4UKO QTHR. 0622 859129

● FT690 Mk2 plus FL6020 linear: £350. Mobile whips G-whips 40m, 15m, 10m. Navy specials 20m, 80m 2x10m whips. All at: £10.0ea. Straight brass key: £40. SEM lambic keyer: £20. NEC green screen, high res monitor: £45. G0JEJ QTHR. (Bishops Waltham) 0489 894960

● DX ant: £15. The final solution. 1 hydrogen cylinder with special release valve. Sorry no balloons left. G3RUG QTHR. 061-491 3814

● COBRA 144 cvtv 10m fitted processor: £100. Zetagi B300P mobile amp 3.5-30 200 PEP: £70. GMOLEY. Bob. (Livingston) 0506 32868

● ALTRON AO620/3E mini beam, 2mths old: £160. Homebrew 301 retractable alum lattice tower: £50 with winch. Buyer collects. GM3AHR QTHR. (Bonnaybank, Fife) 0333 350580

● BC348 comm rcvr. GWO cw mains PSU: £250.00. VHF sig gen 8-210MHz, old but working: £10. 6/6 slot beam 2m yag: £10. G8BXM. (nr. Hitchin) 0462 700140

● TS830S, boxed in immac cond inc 500Hz CW

filters and deluxe knob: £625. AT230: £120. SP230: £25. DL600 600W dummy load: £20. LF30A low-pass filter: £10. Mark GODYX. 01-308 0991

● SONY ICF7600DS, boxed, as new. Ideal present: £120.00. Pye Cambridge potentiometer: £20. G4LZF QTHR. (Luton) 0582 596760

● KW202, 204, TX recently revalued: £200. Buyer collects. G0CBU QTHR. 04024 45135

● YAESU FT290R, nicads, case, chgr, boxed. Exc. cond: £230. MM 10m tvt 2m IF 10W/0P. Suits above. Exc: £60. Possible p/exch 2m H/H ICZE TR2300 etc. G0IVA. (Stockport) 061-456 8499

● KENWOOD TR751E, mint, unused, boxed with manual: £559. G4UBQ QTHR. (Wakfield) 0924 384021

● ICOM 02E h/hold, chgr, case, insts: £190. Icom 3200 dual-band mobile complete, boxed, mint. Incms mobile ant: £325. G1GQL QTHR. (Hants) 0425 54946

● HEAVY duty 12V batt: £20. AR200XL rotator with support bearing, control box, cable: £30. Roy, G0EWC QTHR. (Bristol) 0272 776891

● AIRBAND rcvr R537S, boxed, immac, hardly used. VFO tuning plus 2 xtal channels, squeel, vol on/off, detachable ant, int spkr plus phone socket. Batt operation, PP3, plus pwr jack. Lovely little unit, was £69.50 new, take: £45. GM4AHW. (Glasgow) 041-637 9676 after 6.30pm

● R1302B h/bok: £15. 40ft lattice tower base mounted. Finished in blue epoxy, fair cond: £100. Various lengths of Heliax type coax cable with N-type connectors from: £35. Allan G6EII. (Warrington) 0925 727160

● UNIDEN 2830 multimode TX/RX, as new. Comes with Zetagi B300 3.0MHz lin 170W PEP: £250. Aircraft scanner R532: £110. G4SEF. 0469 74657

● YAESU FT480R 2m multimode tcvr 1-10W: £260. Manuals etc. In line cond. G1LCI QTHR. (Maidenhead) 0628 22352

● SHACK CLEARANCE. TS830S R/VFO420-SP230, Shure 526T Clark 40ft tele/air mast, 2kW HF linear, 1kW HF linear, Transmatch ATU, Nevada ATU. Eddystone 1002/1RX, 150KHz 108MHz. Hansen SWR meter, Siltronix SWR meter 13v PSU 5A, 10FM DNT-20W amp, RN type key, 28/29MHz Lin/amp 4CX2506, KLB110 solidstate 28/29MHz 80W amp, Pye AC200 PSU 1515A +clock, Pye BC11 charger +20.15V nicads. PF2 AM HB. G8KW HF dipole 28-29MHz G-plane. Codar rx preselector etc. Valves: 5x6146B, 9x4CX250B, 1x4CX1000A G3WMM Hants. SAE for full list or phone any evenings (0329-661198)

● ICS AMT2. RTTY/ASCII/AMTOR/CW. Works with BBC. Commode etc. Also inc BBC s/ware on Epram: £95. G0WFOY. (Swansea) 0792 299342

● BNOS 25A PSU: £150. G0FWX QTHR. 0562 60401

WANTED

● RACAL RA117 wanted for spares. Non-working OK if mechanically complete. Could be interested in working rcvr if price is right. Pete. G8BBZ QTHR. (Hemel Hempstead) 0442 69544 after 8pm & w/e

● YAESU FL7010 amp for FT790R up to £35. G6YJU QTHR. (Bradford) 0274 640332

● YAESU FT107R tvt main frame plus 6m linear. G8AHN QTHR. (South Yorks) 0709 361159

● INDUCTION spark coil and Tesla coil or construction details. Blue grade Ferrite rod. (Crewkerne) 0460 76143

● CAMPBELL mutual inductometer. Early version by Cambridge or Paul 100x1mH in steps with 1mH variable, or improved version by Cambridge, 10x0.1mH in steps with 0.1mH variable. Also S-type resistors. (Royston) 0763 245381

● PYE Whitehall wanted. E-band, ex-RAF, 68-88MHz version. Control gear not essential and a non-working unit is acceptable though working preferred. Good price offered, plus collection or carr. Simon. (Newark) 0636 72625 anytime

● DELUXE VFO, knob to fit TS830/530. Must be mint cond. Will pay post. G0KPH QTHR. (Leamington Spa) 0926 429719

● SSB adaptor for B40D. Spare valve box, for WS19. Any rough common sets or BC348 for spares or complete ones. Orig. PSU for HRO. Other interests, orig. R1475 with front cage and PSU command modulator dynamo DM33. 52 Bramble Lane, (Mansfield, Notts)

● ORIGINAL S-meter for HRO rcvr. Must be in working order. G3AXN QTHR. (Minehead) 0643 703309

● CIRCUIT diagram and/or alignment info for Ham-Master HM2010. Solid state c/o info for FT707. G3UPA QTHR. (Meriden) 0676 22767

● BRAUN T1000 Global multi-band portable radio. Made 1960s. Any cond if PCBs intact. Also interested in other Braun equip. G6RXX. (Crewkerne) 0460 77292

● YAESU FL100 solid state linear 80-10 100W companion linear to FT7 tcvr. QTHR. (Glastonbury) 0458 33205

● HF tcvr TS130 or TS830. Must be totally mint cond. Good price paid. G4AEQ QTHR. (Lincoln) 0522 682772

● BAROGRAPH, atmospheric pressure recorder, c/w spare charts. G3JBU QTHR. (Northampton) 0604 401800

MEMBERS ADS

- SONY AC170V9V PSU for AN1 controller. High 18AVT/S, 11/8x14in, part no 70271. New if poss. Matt BRS35140, 26 Bromford Cres, (Birmingham) 021-350 0048
- ATU KW107. Must be mint cond. G3XXO QTHR. (Workop, Notts) 0909 472316
- MORSE code training 78rpm records (other than Columbia) wanted. £20 offered for the set on the Winner label if mint and c/w booklet. £10 each offered for any or all the 12 HMV Morse records nos B625-B630 and B789-B794. Again if mint with booklets. Records in less than mint cond still required. Offer proportionally less. Don't send through the post! Phone or write first. Thanks. Norman Field G4LOF, 14 Regent Rd, Harborne, Birmingham, B17 9JU. 021-426 3663
- EX-GOVT UHF and microwave sig. gens. 10GHz gear, waveguide, flanges, wavemeters, Klystrons, xtal. T1154, SCRS22, 19set. Thermocouple TC102 for Marconi TF144H, circuit for x-band test set CT118. G3MFW. Trenoweth, Porthpean, St. Austell, Cornwall.
- MORSE keys GPO service types etc, KW107/9, HW8 or similar, SP930, SM220, IC251 with Mutek. G4WJB. (Peterborough) 0733 43021 eve
- TEN-TEC Argonaut, Atlanta, Argosy. G2CYN QTHR.
- BEG, borrow or steal KW202 RX figure illust 6-2 6-3 showing test points. Align inst for Yaesu FL508 TX will re-imburse for any help given. G3JUJ 31 Avondale Rd, Fleet. 0252 615831
- ATU Yaesu FC102 or FC902. Also FT707 or TS130S HF tcvr. G0KBS. (Merseyside) 051-722 2898
- GEM quad ant and or any spare parts, arms, spider, glassfibre rods etc in sound usable cond. Anything considered. G4RLZ. 0566 82420 eve
- EDDYSTONE EA12 manual top purchase or copy. G8AMJ QTHR. (Norwich) 0603 738440
- TRANSISTORS type 2SC11781. Please phone giving price and quantity. One would help. G4GPH QTHR. (Cleethorpes) 0472 698638
- STILL wanted. Drake MN2700. Must be in exc. cond. Unmodified. Would the G4??? contact me again. Max. G3WMB QTHR. (Ware) 0920 463564
- PAIR of matched 6KD6 valves, or equiv. to restore the voice of an otherwise fine FTDK401. G3UYS QTHR. (Plymouth) 0752 774405
- FRV7700 VHF cvtrs for Yaesu FRG7700. RS90563. (Newcastle-Emlyn) 0239 711299
- PW Heilford reqd xtal filter. Either XF9B or QC1246AG and PA board to complete a delayed project. Bob G4IWH. (Watford) 09277 65550
- KW109 ATU. SP230 spkr. DL600 600W dummy load. LF30A LPF. MC355 mic. 6146Bs, 12BY7As, 6CH6. W/shop manual TS830S. HIZ ceramic mics. (Coventry) 0203 363123
- TRIO TL120 100W linear for Trio TS120. G4MIF not QTHR. (Farnborough) 0276 35531
- YAESU YC7B freq display unit for FT7B tcvr. Kenwood LF30A lowpass filter Noda-Tushin 427H swr/pwr meter. GW4RLP QTHR. (Caernarfon) 0286 5264
- STILL reqd. '10 or 210 and 015/400. OT please note. Also needed, wartime USA 6A8 metal with full paintwork. G4IMT QTHR. (Chippenharn) 0225 891254
- XTALS for amateur bands for hopeful builder of QRP transmitter. G0JLD QTHR. 0643 5196
- SPECTRUM interface one with or without microdrives. Or cir diag to repair one such. Will photocopy. Hayman. G3ABU QTHR. (Torquay) 0803 873401
- MOBILE m/bracket for FDK multi 700AX and Hoxin model GPV5 144MHz colinear base ant or similar. G6ZPJ QTHR. (Carlisle) 06974 73465
- SP520 matching spkr for TS520. Also DG5 digital display wanted and VFO520 ext VFO. Dean. G0JQR QTHR. (Ashington) 0670 819297
- NEMS, Clarke rcvr R1421/1 WHY. Can anyone help me in obtaining Drake MS4 spkr, 455kHz USB and LSB filters, parts for Eddystone 1590 rcvr, coax filters, splitters, combiners, h/books on any Collins nems, Clarke, CEI, DEI, Astro, Stoddard, Singer equip. Allan G6EIH. (Warrington) 0925 727160
- PRESELECTION wanted, made by Plessey, type number PV158. Allan Edwards. 0277 810241.
- EARLY wireless sets wanted. Also horn speakers, xtal sets, unusual shaped radios, early Ham rcvrs. Any cond or incomplete welcome. Also early books, components, catalogues, Wireless Worlds. Drake MS4. Sherwood filters. James G4ERU, 5 Luther Rd, Winton, Bournemouth. 0202 510400.

EXCHANGE

- EXCHANGE FT101 Yaesu HF tcvr for best scanner offered or WHY. GW4VWY. 0443 772387
- FT290R plug-in PSU PCB. Replaced volt reg or p meets spec. Exch for morse key straight or paddle. (Southampton) 0703 260462
- FT707, FC707 for Union 28/30 10m multimode. No room for large aerials but want to keep 10m. Phil. G0JXR QTHR. 0992 468522
- KENT paddle: £30. Will do deal for 13V/10A PSU or Jaybeam PBM10/2m yagi. (Wolverhampton) 0902 783299

HELPLINESHELPLINESHELPLIN

TRIP OF A LIFETIME

Not as many requests as usual for assistance this month - must be all the DX that's been about! Firstly, Mr R Jones, G0INX, writes 'I would like to enlist the help of members in a small way over the next 12 months. A young friend and neighbour of mine here in Guildford together with two others, all in their early twenties, have set off on a round-the-world trip of a lifetime. They flew to Singapore on 30 September and intend spending six weeks there and in Thailand, carrying on to Australia and New Zealand. From there they intend to work their way around for six months and then carry on to destinations yet to be decided. Those fathers and mothers amongst us will appreciate that a certain amount of apprehension is felt by the parents of these lads! I have suggested to them that they try and contact radio amateurs on their travels, with the object of passing information back to the UK as to their whereabouts, etc, which can be passed on to the families concerned. The name of my friend is Nick Pearce, and his home is here in Guildford, Surrey. Should any station in the UK hear any news of Nick and his friends over the coming months, I'd greatly appreciate it if they would contact me - G0INX - on 0483 576542, and I will see that their families are kept informed. Sounds like a good idea, and we'd be interested to hear how the trip goes.

RANK VIEWDATA TV SET

Next off the pile is a letter from Mr C N Hamer, who says, 'Here's a real stinker for you. Does anyone have a circuit diagram or any other information on a Rank Radio International Viewdata television set, type BC6482A, the chassis is a T12B and the serial number is 00280. Rank admits to making them and even to selling one (mine) but they have no information on file. Failing info on the TV, a particular IC seems to be at the root of the problem and any information on it would be welcome; it's a 16-pin DIL package with the marking H ETI 6016 7724 on the top and 5130 on the bottom. Any help would be gratefully received.' Mr Hamer's address is 37B Chapel Road, Penketh, Warrington, Cheshire WA5 2NG and you can ring him on 0925 282216 (evenings only please).

Sounds like a knotty problem - have you thought of dropping a similar line to the editor of the excellent *Television* magazine to see whether they can help? His name is John Reddihough and he's a most helpful gentleman - *Television* is published by IPC Magazines Ltd, King's Reach Tower, Stamford Street, London SE1 9LS.

STOLEN YAESU

If you've offered a Yaesu FT757GX Mk 1 with the serial number 4F091077, it's been stolen from Mr John Curtis, G0HVA - together with an SEM Transmatch with Ezitune and an Audioline 341 CB rig. The amateur equipment has been marked with John's callign in ultra-violet security pen. If you've been offered any of this equipment in suspicious circumstances, ring him on 0305 852403 or drop him a note at Glebe Farm, West Knighton, Dorchester, Dorset DT2 8PE.

DUNDEE AMATEUR WIRELESS ASSOCIATION

Now a letter from Mr J A Hughes, GM3LCP, who writes, 'On page 296 of the book *World at their Fingertips*, reference is made to the 'Dundee & District Amateur Wireless Association'. This is in a list of such associations which made petition to the Postmaster General on 29 December 1921. I edit an occasional newsletter for the present Dundee Amateur Radio Club. The club celebrates its 21st anniversary in 1990, and I would dearly like to be able to publish some information about our predecessor. Unfortunately, a search through local libraries has yielded nothing. I wondered if, by any chance, the RSGB has any archival material and, if so, does it include any mention of or information about the old Dundee Association. Failing that, do you think that a short paragraph in *RadCom* might produce a response? Well, you never know your luck, sir! We've passed a copy of your letter to the Society's archivist, George Jessop, G6JP, to see whether he can come up with anything, and herewith a note in *RadCom* as requested. If anyone knows anything about the Dundee & District Amateur Wireless Association, please write to J A R Hughes, OBE, GM3LCP at 6 Claypotts Terrace, Broughty Ferry, Dundee DD5 1LE.

SIGNAL GENERATOR AND AUDIO ANALYZER

What next? Here's a letter from G0JUN, who says 'I have recently acquired two pieces of test equipment - an Airmecc 701 signal generator covering 30kHz-30MHz and a Heathkit Audio Analyzer Model IM-20. Unfortunately I do not

have any information whatsoever on either of these two items; I have made numerous enquiries but to no avail. Therefore I write with cap in hand in the hope that someone somewhere can help me. I am prepared to buy or borrow (to photocopy) the relevant information, and of course all costs will be refunded'. If you can help, write to Mr R Soffley, G0JUN, at 14 Topps Drive, Bedworth, Nuneaton, Warwickshire CV12 0DE, or ring him on 0203 363123.

NEWBRAIN QD COMPUTER

A short and sweet note now from G3RYY, who says 'I would like help in finding a fault on a 64K Newbrain QD computer and what software is available. Telephone Chorley 02572 62250'. If you know all about the Newbrain, perhaps you could drop a line to Mr M Penketh, G3RYY, at Greenways, Bolton Road, Duxbury, Chorley, Lancs PR7 4AJ.

SPECIAL PEN NIBS

It's not often we get asked about pen nibs, but read on. Mr W Hall, G8JM, writes, 'Jack White, ZL2GX, is the Awards Manager for NZART and he has written to me about the special nibs he uses for making out his certificates. They are made by William Mitchell of Birmingham, but are now no longer available in New Zealand. He says that he only wants sizes 5 and 5½. I have tried W H Smith and other local large stationers, but so far without success. Can anyone help with these?' If you can, please write to Mr Hall at 48 Hawkdene, North Chingford, London E4 7PF.

QRV ON TOP BAND?

Mr P S Marchant, G4OIM, is interested in having contacts on 1.8MHz between 0730 and 0800 local, especially with stations using simple equipment or mobiles. He's in Bromley, Kent and skeds can be set up either by writing to him at 29 Hilldrop Road, Bromley, Kent BR1 4DB or ringing him on 01-467 2600 ext 6908 during working hours. Mr Marchant is also interested in 28MHz inter-G working

KENWOOD R300

Finally this month, we've had two more letters about the Kenwood R300. First of all, Mr R Taylor, G4TKI, says 'My personal white elephant is an R300 slowly disappearing under a pile of dust on the shelf, so any words of wisdom from those who have been more successful than I in taming the beast would be welcome. A peep into your files would be appreciated'. Unfortunately, what we have consists mainly of a copy of part of the instruction manual and some circuit diagrams - we haven't anything on how to get the best out of the rig, unfortunately. Similarly, Mr J W Dainty, G4PDN - who incidentally is 83 years of age, although you wouldn't believe it from his exquisite handwriting - says 'If you have any information that clarifies that given in the Rx's manual, I would be grateful'. Alas, that's exactly what we haven't got! There's obviously room here for an article about the R300 - would anyone who is conversant with this machine like to write one for us? Alternatively, just a set of notes which we could work up into an 'In Practice' feature would be fine. In the meantime, anyone who can assist Messrs Dainty or Taylor is invited to write to 43 Copse Avenue, West Wickham, Kent BR4 9NN or 63 Peace Road, Stanway, Colchester CO3 5HL respectively.

Mr Dainty also writes, 'For various medical reasons, my memory of Morse has gone and, despite many efforts to relearn it, the alphabet will not stick. I wonder whether anyone else has been troubled by this and has found a method of overcoming the loss. It has been suggested that if the Morse could be projected on a VDU, this might be the answer - but I do not know of an add-on device to a transceiver which would do this. I operate an FT102 and a KW2000A. I hope Helplines can help. So do we, sir - anyone with any ideas on this subject is asked to write to Mr Dainty at the West Wickham address given above.

And with that, we've reached the bottom of the postbag for another month - have a very merry Christmas, and don't forget to write in with problems and solutions in 1990!

Helplines is designed to help put people in touch with each other. If you have a problem, it's more likely there's someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts; if you have solved a particular problem, write and tell the rest of us. 'Helplines' is there to help you and to give you the opportunity of helping others. Write to us marking your envelope 'Helplines' and we'll do what we can to get the message out.

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the FEBRUARY 1990 issue must be sent to HQ marked 'Club News - DIARY', to be received by 18 December latest. If news is received by the published deadline, it will appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

AVON

- South Bristol ARC - 6, judging for Terry Dunford Trophy; 13, HF activity evening; 20, Christmas party; 27, 2 metre activity evening; Jan 3, photographic equipment evening; 10, HF activity evening; 17, Bristol Rally planning evening.
- Thornbury & DARC - 6, quiz.
- Weston-Super-Mare RS - 18, home brew and pre-Christmas social evening; Jan 8, AGM; 15, constructors evening.

BEDFORDSHIRE

- Bedford & DARC - 15, special event station - Loss of Glenn Miller at Twinwoods Airfield - GB2WW - HF VHF packet. Details from Glenn Loake, G0GBI, 81 Duchess Road, Bedford MK42 0SE. tel: 0234 266443.
- Dunstable Downs RC - 22, club party.
- Shefford & DARC - 7, NFD washup meeting; 14, talks from construction contest winners and runners up; 21, chairman's mince pie night. Details 0707 372211.

BERKSHIRE

- Maidenhead DARC - Meets 7.30pm on 1st Thursday and 3rd Tuesday in the month at The Red Cross Hall, The Crescent, Maidenhead. Details from Mr Neil Savin, G8XYN, 7 Bannard Road, Maidenhead. Tel: 0628 25952. 7, Christmas social including judging of construction contest and prize giving; 19, Christmas quiz; Jan 4, equipment clinic. Details Maidenhead 25952.
- Reading & DARS - 14, AGM and wine & cheese evening; 28, informal Christmas evening.

BUCKINGHAMSHIRE

- Aylesbury Vale RS - 6, the G6NB Bill Billcliffe Trophy construction contest; 20, informal evening reflecting on the successes of 1989. Details 0280 817496.

CAMBRIDGESHIRE

- Cambridge & DARC - 1, informal - evening in the shack - Morse class; 8, club Christmas party.

CLWYD

- Conwy Valley ARC - 7, talk 'Power Supply Construction' by John Lawrence, GW3JGA.
- Delny RC - 5, RSGB video; 19, mince pie night. New friends and old always welcome. Daniel Owen Centre, Mold. Details 0244 819618.

CO ANTRIM

- Carrickfergus ARG - 5, construction and CW; 12, social evening. Details 09603 66109.

CORNWALL

- Saltash & DARC - Meetings held 1st and 3rd Friday of each month at the Toc H Hall, junction of Warraton Road and Oaklands Road, Saltash, 7.30 for 8pm. 1, open evening - radio equipment demo and advice on taking up amateur radio; 15, social evening at the 'Rodney' pub, Saltash. 8pm onwards. Details 0752 847705.

DERBYSHIRE

- Buxton RAS - Meet at the Leewood Hotel, Buxton on alternate Tuesdays at 8pm. Details from Derek Carson, G4IHO, 21 Harris Road, Harpur Hill, Buxton, Derbyshire, SK17 9JS, tel: 0298 25506. 12, 8pm at Leewood Hotel, Buxton.
- Derby & DARS - 6, junk sale; 13, constructors contest; 20, Christmas party in the clubroom. Details 0332 669157.

DEVON

- Exmoor RC - NEW SECRETARY Nigel Puttick G4PGW, tel: 07697 607. 6, quiz night versus Appledore & DARC. (date TBA) club meteor scatter evening
- Torbay ARS - 1, 8, club nights; 15, Christmas party; 22, 29, club nights; Jan 5, 12, club nights; 19, monthly meeting followed by construction competition judging. Details 0803 526762 and 0803 329055.

DORSET

Flight Refuelling ARS - 3, talk "Goodies for Christmas" by FR wine circle; 10, quiz time by John, G6AZV; 17, video surprise; Jan 7, talk "Antennas" by John, G0API.

EAST SUSSEX

Hastings E&RC - 20, Christmas social; Jan (date TBA) talk "M16 & Pirate Radio on the Thames" by Mr T. Albury.

ESSEX

Braintree & DARS - 4, TBA; 18, Christmas social.
Chelmsford ARS - 5, junk sale.
Loughton & DARS - 1, film show - films & video from the past years of the club and 1989 field weekends by Jack Atkinson, G3OPA and John Short, G1DJ; 15, Christmas meal - venue TBA. Details 01 508 3434 (after 7pm).

GLOUCESTERSHIRE

Gloucester ARS - 6, TBA; 13, Christmas buffet - 50p per person in advance. Details from G4RHK.

GRAMPIAN

Aberdeen ARS - 1, junk sale; 8, video night. Details from GMOCSZ, tel: 0224 780519.

GREATER LONDON

Acton, Brentford & Chiswick ARC - 19, disposal of surplus gear.
Clifton ARS - Meet at St. Peter's Centre, Cranfield Road, Brockley.
Cray Valley - Contact is Mr E.J. King, G3DCC, 109 Marlborough Park Avenue, Sidcup, Kent, tel: 01-300 2854.
Edgware & DARS - 14, annual junk sale; Jan 11, AGM; 25, informal. Details Hatfield 65707.
Southgate ARC - 14, AGM.
Wimbledon & DARS - 8, Christmas social evening. Details 01-330 2703.

GREATER MANCHESTER

Eccles & DARS - 5, talk and demo "Superconductors" by G8DTF. Details 061-773-7899.
Stockport RS - 13, AGM. Details 061-439-3831.

GWENT

Newport ARS - Telephone number for Kevin Snelling, GW7BSC is 0633 262488.

HAMPSHIRE

Basingstoke ARC - NEW SECRETARY Andy Wynn, G1JTO, tel: 0256 64756 (home), 0256 492677 (work); 4, talk "An Insight into Radio Control of Model Aircraft" and presentation of G3CBU Memorial Operating Award; 31, 10.30 - foxhunt - frequency 145.425MHz OS Map Sheet 185; Jan 1, talk "An Insight into Cellular Radio" by G4SQZ.
Fareham & DARC - 6, talk "Setting Up Aerials Using Simple Test Equipment" by Ron, G3XPH; 20, "It's not ITF's slide show. Members nite. Bring along your slides".
Farnborough & DARS - 13, Christmas social; 27, to be decided.
Horndean & DARC - 7, talk "Survival" by G4DIU; Jan 4, quiz with G4UVP.
Liphook (Three Counties ARC) - 6, quiz night; 16, annual dinner.

HEREFORD & WORCESTER

Kidderminster & DARS - 5, visit to BBC Evesham; limited number of places available; 19, club social evening; Jan 9, Ordinary General Meeting followed by talk "Safety In (and Out of) The Shack" by G7EZA. Details 0562 751584.

HERTFORDSHIRE

Cheshunt & DARC - 6, talk "Top Band Operation" by Neville, G3RFS; 20, Christmas social evening - TBA. Details from G4OAA.
Stevenage & DARS - 5, junk sale; 19, talk "Test Equipment Usage" by Tony, G1ZZH. Details 0438 724991.

HUMBERSIDE

Goole RES - 1, discussion on Project YEAR; 8 Christmas dinner; 15, talk "Airshows" by GAJAM; 22, Christmas quiz; 29, social evening. Details Goole 69968.
Grimsby ARS - 14, Christmas party, YLs/XYLs welcome. Prizes, mince pies, sherry & sausage rolls all laid on.
Hornsea ARC - 6, talk "Switched Mode Power Supplies" by Steve, G8EWX; 13, talk "Middle East Trucking" by Stuart, G1KT; 20, talk "RAF Electronics" by Rick, G1YVL; Jan 1, talk "Technical Topics" by Jeff, G4IGY; 10, Annual dinner. Details 0964 533331.

KENT

South East Kent (YMCA) ARC - 13, top-band foxhunt; 20, Christmas social; Jan 10 talk "TVI - The Problems and Cure" by G4HXE; 17, committee meeting. Details 0304 852533.
West Kent ARS - 1, talk by K.W.

Communications Ltd; 15, fastest construction challenge. 8pm, Quarry Hill Annexe, Camden Road, Tunbridge Wells.

LANCASHIRE

Fylde ARS - 14, supper and social evening.

LEICESTERSHIRE

Leicester RS - 4, HF & VHF NFD slides and video; 11, committee meeting, HF/VHF activity night; 18, mince pie social evening.

LINCOLNSHIRE

Grantham RC - 12, video evening plus natter & noggins, with refreshments provided. Details 0476 61439.

LOTHIAN

Lothian RS - 13, social evening; Jan 10, TBA.

MERSEYSIDE

Wirral & DARC - 13, talk "Two Years with the British Antarctic Survey" by Ron, G3SVW; VPBLK; Jan 10, AGM; 24, surplus equipment sale. Details 051 648592.

NORFOLK

NORCAT ARS - Now known as Kings Lynn ARC, NEW SECRETARY Mr Derek Franklin, G1TQK, 2 Ashgrove Cottages, West Winch, Kings Lynn, Norfolk, G33 OGB.
Norfolk ARS - 6, informal and committee meeting; 13, talk "Beyond Packet - the Computer Works" by Alan Wright, G0KRU; 19, Christmas party. Non members £1.25; Jan 3, talk "The Big Guns of Contesting" by Rick Johnson, G3VZT; Jan 7, 80m AFS; 10, talk "Radio Astronomy" by Ron McArthur, Norwich Astronomical Society; 17, debate "Should Amateurs Homebrew?" Details 0508 78258.

NORTH YORKSHIRE

North Ferry United ARS - 9, club dinner to which all radio amateurs and friends are invited. Details from G4VKK, tel: Hull 844662.

ORKNEY

Orkney AR Group - 6, nosh up; Jan 10, slides & tape "Aurora - What Causes It?"

OXFORDSHIRE

Oxford & DARS - 14, club night.

SHROPSHIRE

Telford & DARS - 6, G3ZME on the HF bands; 13, the Club's response to the Novice Licence; 20, Christmas dinner at the Station Inn. Book with G3UKV; 27, informal meeting, Station Inn; Jan 3, club station on VHF bands. Meetings take place at Dawley Bank Community Centre, Telford at 7.30pm. Details Telford 770922.

SOMERSET

Mid Somerset ARC - 8, open evening; 15, Christmas meal; Jan 5, open evening; 19, talk by Mr D.A.I. Jackson, District Manager, Radio Investigation Service, DTI. Details from G7FPW.
Yeovil ARC - 7, video night.

SOUTH GLAMORGAN

Cardiff RSGB Group - 11, Christmas dinner at the Pantmawr Inn. 7.30pm for 8pm; Jan 8, talk "Satellite Communications" by Jim Baker of British Telecom, Pantmawr Inn, 7.30pm. Details 04463 3212.

STAFFORDSHIRE

Stafford & DARS - 12, night on the air; 19, RSGB video - "Electromagnetic Wave"; The Electron's Tale" and "Thin Film Microcircuits".

SUFFOLK

Felixstow & DARS - 11, night on the air (Orwell Park School); 18, Christmas social (Ferry Boat Inn). Details 0473 642595 (daytime).
Ipswich RC - 7, Morse test at Ipswich; 13, quiz.

SURREY

Coulsdon ATS - 11, AGM.
Dorking & DARS - 12, constructional contest, Ashcombe School; Jan 9, informal, Falkland Arms; 23, AGM, Ashcombe School. Details 0306 77236.
Reigate ATS - 19, traditional pre-Christmas gathering.
Sutton & Cheam RS - 3, 144MHz fixed and AFS contest; 15, Christmas get-together in the Downs Bar.

TAYSIDE

Dundee ARC - 5, talk "Certificate Chasing" by Sam Hall, GM2AOL; 12, construction and demo.

TYNE AND WEAR

Hazlerigg ARC - Meets at Hazlerigg Community Centre, Hazlerigg, 1 mile north of

Newcastle, every Monday night at 7pm. Activities are; project evenings, beginners Morse, lectures, and discussion groups on specialised subjects. Details from GOMEF.
Wansbeck Radio Club - meets every Tuesday night at 7pm and Friday afternoon at 2pm at the Cambois Aerial Farm, Cambois, near Blyth. Activities are as for Hazlerigg ARC. Details from GOMEF.

WARWICKSHIRE

Mid-Warwickshire ARS - 12, Christmas supper night with RSGB guest; Jan 9, night on the air at Warwick School. Details Kenilworth 513073.
Rugby ATS - 5, talk "The UC1332 Upconverter" by Mr S. Hunt, G3TXQ; 9, annual dinner - see Denise, G8HYU; Jan 9, bring & buy sale.
Stratford upon Avon & DARS - 11, RSGB video plus visit by RLO; 25, at 11am, Christmas on the air (145.275); Jan 8, talk "Test Equipment" by David Jones, G6FEO.

WEST GLAMORGAN

Swansea ARS - 7, AGM followed by buffet, 8pm at College House; 21, Christmas quiz.

WEST MIDLANDS

Coventry ARS - 1, illustrated talk "The History of the QRP" by Norman, G4LOF; 8, night on the air and Morse tuition; 15, Christmas fun/ novelty competition; 22, night on the air and Morse tuition/social evening; Jan 5, night on the air and Morse tuition; 12, computer night - bring your own if you can.; 19, night on the air and Morse tuition. Details 0203 610408.
Solihull ARS - 21, Christmas social evening.
Stourbridge ARS - 4, on the air; 18, talk "Ni-Cad Batteries"; Jan 8, on the air; 22, talk "Forensic Scientist".

WEST SUSSEX

Chichester & DARC - 5, chat night; 19, Christmas social.
Horsham ARC - 7, AGM.
Mid Sussex ARS - 7, Christmas dinner - Inn the Priory.
Worthing & DARC - meets every Wednesday in the Parish Hall, South Street, Lancing; 6, workshop practice; 13, Christmas party. Details 0903 735893.

WEST YORKSHIRE

Halifax & DARS - 19, Christmas social - free pie & peas; Jan 16, talk "Mountain Rescue" by Peter, G6CNL.
Keighley ARS - 5, talk "The Sun" by L.M. Dougherty; 19, Christmas buffet.
Northern Heights ARS - 6, 6th members' equipment, alignment evening with Alan Robinson, G3TOA.
Otley ARS - 5, night on the air; 16, Christmas party.
Pontefract & DARS - 7, night on the air; 14, Christmas social night (YLs XYLs & families invited); 21, committee meeting/night on the air; 28, Merry Christmas & A Happy New Year - join us in the bar for a drink; Jan 4, talk TBA; 11, committee/night on the air; 18, junk sale (Main Hall).
Spenn Valley ARS - 7, Packet Radio demonstration by John Bowyer, G4KGS; 21, Christmas social; Jan 4, RSGB videos 18, visit to Arena 1, Electronic News Gathering.
Tadworth & DARS - 4, George Dobbs annual Christmas lecture; 18, fun and games night; Jan 1, construction competition; 15, talk by Des, G3JWN (provisional).
White Rose ARS - 6, informal evening; 9, Christmas dinner.

WILTSHIRE

Blackmore Vale ARS - 12, Christmas dinner. Details 0747 840558.
Trowbridge & DARC - Jan 3, 5th AGM; 19, social. Details 0380 830383.

MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

10 DECEMBER

Leeds & DARS Christmas Rally - Pudsey Civic Centre, Dawson's Corner, Pudsey, nr Leeds. Details G Stubbs, tel 0532 585801.
Coulsdon ATS Annual Bazaar - 4th Purley Scout HQ, Lion Green Road, Coulsdon, Surrey. Further details from Alan Bartle

(Secretary), 105 Mayfield Road, Croydon, tel: 01 684 0610.

24 FEBRUARY 1990

Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Details from Bob, G0LKE, tel: 0634 362154.

25 FEBRUARY 1990

3rd TAW & Torridge Rally - BAAC Hall, Bideford, Devon. Doors open 10.30am. Trade stands, bring & buy, bar, refreshments, talk-in S22. Details: G0GFK 02372 76402.

3 MARCH 1990

Tyneside ARS Rally - North-Eastern Exhibition Centre, Gostorth Park Race Course, (1 mile north of Newcastle upon Tyne). Usual trade stands, Morse tests, bring & buy, refreshments, and ample free parking. Talk-in on S22 and S08. Details from Terry, G6VEG tel: 091 264 8196.

4 MARCH 1990

Trafford Rally - G-MEX, The Greater Manchester Exhibition & Events Centre, City Centre, Manchester. Doors open at 10.30 for all, with priority to any disabled visitors. Admission £1. Usual and new traders. Parking. RSGB stand. Bring & Buy. Morse tests. Refreshments. Licensed bar. Talk in station (G81GMX) on S22. 2m. Details from Graham, G1UJK tel 061-748 9804.

11 MARCH 1990

South Essex ARS Mobile Rally - The Paddocks, Canvey Island, Essex. Starts 10 am. Trade stands, bring & buy etc. refreshments. Details Ken Hendry, G0BBN, tel: 0268 755350.
Welsh Mobile Rally - Barry Leisure Centre, off Horton Road, Barry, South Glamorgan. Details GW6RCK.

18 MARCH 1990

Northern AR Norbreck Rally - Norbreck Castle, Blackpool. Details from Chris Harrison, tel: 051 275 5705.
Wythall Rally - Wythall Park, Worcs. Details G0EYO.

25 MARCH 1990

Pontefract & DARS 11th Components Fair. Details from Mr B. Senior, tel: 0977 704067.

1 APRIL 1990

White Rose Rally - Leeds University. Details G4DXA, PO Box 73, Leeds LS1 5AR.

8 APRIL 1990

Cambridgeshire Repeater Group Rally and Junk Sale/Auction. Details G0HEM (QTHR).
Launceston ARS Rally at Launceston College. Details from Maggie on 040921 219 or Rodney & Joy on 0566-5167.
Swansea ARS Rally - Swansea Leisure Centre. Details from Roger, tel: 0792 404422.

15 APRIL 1990

Centre of England AR Rally - Motorcycle Museum, Bickenhill, near NEC Birmingham. Details from Margaret or Frank, G4UMF, tel: 0952 598173.

29 APRIL 1990

Bury RS Hamfest - Now moved to a later date in the year to ease congestion with other local events.

13 MAY 1990

Southend & DARS Mobile Rally at Roachway Youth Centre, Rochford, Essex. Details from John Stone, G0DFE on 0702 202216.
Yeovil ARC 6th QRP Convention - Preston Centre, Monks Dale, Yeovil, at 9am with the first lecture at 10.30am. Lectures during the day by GM3OXX, G3RHI, G3PCJ, G3MYM. All usual traders. Food & drink. Further details from G1MMN, QTHR - by post only.

27 MAY 1990

Plymouth Radio and Electronics Fair - Plymstock School, Church Road, Plymouth. Details from Jan Fisher, G0IVZ, tel: 0752 340946 evenings/weekends.

28 MAY 1990

Bircotes Radio Rally - near Bawtry, Doncaster. Doors open 10.30am for disabled visitors. 11am others. Talk-in S22. Booking forms/details 23 Florence Avenue Balby, Doncaster. Tel: 0302 857526.

3 JUNE 1990

British Telecom (S. Wales District) ARS 2nd Annual Radio Rally - BT Headquarters, Coryton, Cardiff. Details from Martyn Jenkins, GW7EYP, tel: 0222 379634 (office hours).

10 JUNE 1990

21st Elvaston Castle Mobile Radio Rally,

Elvaston Castle Country Park near Derby.
Details from John, G4PZY on 0332 767994.
►Royal Naval ARS 30th Annual Mobile Rally -
HMS Mercury, Nr. Petersfield, Hants. Details
0703 557469.

24 JUNE 1990

►City of Bristol Group 33rd Longleat Amateur
Radio Rally, Longleat Park, Warminster, Wils.
Details Shaun O'Sullivan, G8VPG, tel: 0225
873098.

1 JULY 1990

►York Radio Rally - Tattersall Building at York
Race Course. Details tel: 0904 625798.

29 JULY 1990

►Rugby ATS Amateur Radio Car Boot Sale -
venue to be advised. Details from Kevin,
G8TWH, tel: 0203 441590.

19 AUGUST 1990

►West Manchester RC Red Rose Summer
Rally - Bolton Sports & Exhibition Centre,
Silverwell Street, Bolton. Details from Dave,
G1IOO, tel: 0204 24104 (evenings only).

26 AUGUST 1990

►Torbay ARS Mobile Rally - STC Social Club,
Brixham Road, Paignton, Devon. Details
G3HTX QTHR.

2 SEPTEMBER 1990

►Preston ARS 23rd Annual Rally - University
of Lancaster. Details from Godfrey, G3DWO,
tel: 0772 53810.

16 SEPTEMBER 1990

►Bristol Radio Rally - Brunel's Great Train

Shed, Temple Meads Station, Bristol. Details
from David Farr, G4WUB, tel: 0272 839855.

OTHER EVENTS

9 DECEMBER 1989

►RSGB Annual Meeting - AGM, Queen's Hall,
Dunoon, Argyll. Doors open 12 noon, meeting
commences 2 pm.

10 DECEMBER

►Coulson ATS Annual Bazaar at 4th Purley
Scout HQ, Lion Green Road, Coulson.
Bookings for flea market tables must be
received by Wednesday 15 Nov. Details 01-
684 0610.

9/10 MARCH 1990

►London AR Show - Picketts Lock Centre,
Picketts Lock Lane, Edmonton, London N9
(just off the North Circular Road). Talk-in on
2m and 70cm. Bars. Restaurants. Disabled
facilities. Free parking. Huge exhibition area.
Bring & Buy. Dedicated area for Special
Interest Groups. Admission £1. For further
details and advance ticket sales, phone 0923
678770.

11 MARCH 1990

►South Essex ARS Mobile Rally - The
Paddocks, Canvey Island, Essex. Starts
10am. Trade stands, bring & buy etc,
refreshments. Details Ken Hendry, G0BBN,
tel: 0268 755350.

5 MARCH 1990

►Pontefract & DARS 11th Components Fair.
Details Bernard Atkinson, tel: 0977 704067.

1 APRIL 1990

►IARU Region 1 Conference starts -
Torremolinos, Spain. Details G3FKM.

21/22 APRIL 1990

►RSGB National Convention -
NEC Birmingham.
Details 0277 225563.

13 MAY 1990

►RSGB VHF Convention - Sandown Park
Racecourse. Details from Geoff Stone,
G3FZL, tel: 01 699 6940.
►Yeovil ARC 6th QRP Convention - Preston
Centre, Monks Dale, Yeovil. Details from
G1MNM, QTHR, by post only.

29 JULY 1990

►Rugby ATS - Amateur Radio Car Boot Sale.
Details from Kevin on 0203 441590.

GB CALLS

The list below shows all special events
stations licensed for operation during
this month (as at press date). It is
taken direct from the GB Calls file on
the HQ computer. These callsigns are
valid for use from the date given but
the period of operation may vary from
1 to 28 days. The callsign in
parentheses is the source for further
information.

1 DECEMBER

►GB0RRA RED ROSE AWARD
G0JBR
►GB0RRR RED ROSE RALLY
G0JWU
►GB1CDK COASTAL DEFENCE 'K'
G6MWY
►GB1CDM COASTAL DEFENCE 'M'
G6MWY
►GB1CDY COASTAL DEFENCE 'Y'
G6MWY
►GB4RRS RED ROSE SILVER
G0IZR

2 DECEMBER

►GB2CDR COASTAL DEFENCE 'R'
G0DHZ

7 DECEMBER

►GB0WPS WESTCOURT PRIMARY
SCHOOL G0DLR
►GB8XXV 25TH ANNIVERSARY
BRISTOL ARC G3ZKI

8 DECEMBER

►GB4CYP CHRISTCHURCH YOUTH,
PURLEY G4AOJ

9 DECEMBER

►GB4DX "DX" G4BWP

14 DECEMBER

►GB2GMM GLENN MILLER MUSIC
G0GBI

16 DECEMBER

►GB4HMS HER MAJESTIES SHIP
G0ERS

UK BEACONS LIST

CALLSIGN	FREQ (MHz)	QTH	ERP(W)	AERIAL	HEIGHT (m)	BEAM HEADING	MODE	STATUS
GB3ALD	10120.000	Alderney	1	Sectorial Horn	90	030 deg	F2	
GB3ALD	24100.000	Alderney	8	Sectorial Horn	0		F2	Not yet op
GB3ANG	144.975	Nr Dundee	20	4 El Yagi	370	160	F1A	
GB3ANG	70.060	Nr Dundee	100	3 El Yagi	370	160	F1A	
GB3ANG	432.980	Nr Dundee	100	9 El Yagi	370	170	F1A	
GB3AZA	10368.900	Scarborough	50	Single 18" Dish	75			
GB3BSY	2320.880	Barnsley	2	Alford Slot	175	Omni	F1A	Licensed 2/6/88
GB3BUX	70.050	Buxton	20	2 X Turnstile	460	Omni	A1A/F1A	Licensed Jun 88
GB3BUX	50.000	Buxton	40	Turnstile	457	Omni	A1A F1A	
GB3CEM	10368.880	Birmingham	1	Slotted Waveguide	137	Omni	F1A	Operational
GB3CLE	1296.910	Clee Hill	20	2 X 15/15 Slot Yagis	540	North/SE	F1A	Operational
GB3CMS	10368.960	Chelmsford	3	4 Sectorial Horns	107	Omni	F	
GB3CTC	70.030	Nr St Austell	40	2 El Yagi	320	045	F1A	
GB3CTC	144.915	Nr St Austell	40	3 El Yagi	320	045	F1A	
GB3CTC	432.970	Nr St Austell	5	4 El Yagi	320	045	F1A	
GB3CTC	50.042	Nr St Austell						Li
GB3CTC	1296.860	Nr St Austell	50	15/15	300	45	F1A	Licensed 2/6/88
GB3DUN	1296.890	Dunstable	2	HB9CV	263	North	F1A	Operational
GB3EDN	1296.990	Edinburgh	25	2 X Corner Reflector	117	NE/NW	F1A	Operational
GB3EGI	144.945	Belfast	0		350		A1A	Not Yet Op
GB3FRS	1296.850	Farnborough	3	Disc	120	Omni	F2	Operational
GB3GBY	10400.000	Grimsby	1	Slotted Waveguide	100	180	F2	Operational
GB3IOJ	50.065	Jersey	8	Turnstile	115	Omni	F1A	Proposal
GB3IOW	10100.000	Newport, IOW	1	Slotted Waveguide	250	Omni	F2	Temp Non Op
GB3IOW	1296.900	Newport, IOW	100	Alford Slot	250	Omni	F1A	Temp Non Op
GB3IOW	24100.000	Newport, IOW	8	Sectorial Horn		F2	Not Yet Op	
GB3LER	144.965	Lerwick	50	3 El Yagi	107	022	F1A	
GB3LES	2320.955	Leicester	30	Slot	220	160 Degrees	F1A	Off Air
GB3LET	2392.500	Leicester	10	Alford Slot	220	Omni		Licensed 2/6/88
GB3LEV	10425.000	Leicester	4	16 El Slotted WG	220	Omni		Licensed 2/6/88
GB3LEX	10400.000	Leicester	1		220		F2	Operational
GB3MLH	1296.830	Ipswich	700	Slotted Waveguide	80	E/W	F1A	Operational
GB3MHX	10368.830	Ipswich	1	1.2 Metre Dish	80	East	F1A	Operational
GB3MLE	1296.930	Emley Moor	50	Corner Reflector	600	160 Deg	F1A	Operational
GB3MLE	10400.000	Emley Moor	1	Sectorial Horns	600	North/South	F2	Operational
GB3MLY	432.910	Emley Moor	50	8 Over 8 Yagi	600	150	F1A	Operational
GB3NGI	50.062	Garvagh	15	Dipole	240	140/320	F1A	
GB3NHQ	50.050	Potters Bar	15	Turnstile	35	Omni	F1A	
GB3NWK	1296.810	Nr Orpington	50	15/15 Slot Yagi	180	WNW	F1A	Operational
GB3NWK	2320.850	Nr Orpington	5	Alford Slot	180	Omni	F1A	Operational
GB3OHM	3456.900	S Birmingham	2	JVL Alford Slot	171	Omni	F2	
GB3RAL	28.215	Slough, Berks	20	Ground Plane	20	Omni	F1A	Operational
GB3REB	70.040	Chatham	28	2 Element Yagi	65	66	F1A	Licensed Aug 88
GB3RMK	50.060	Nr Inverness	40	Dipole	270	0/180	F1A	
GB3SCX	10368.250	Bournemouth	1	Slotted Waveguide	65	Omni	F1-F2	Not Yet Op
GB3SIX	50.020	Anglesey	100	3 El Yagi	58	270	F1A	
GB3SUT	432.890	Sutton Coldfield	10	2 X 8 El Yagi	270	0, 135	F1A	Operational
GB3SWH	10368.000	Bushey, Watford	1	Slotted Waveguide	187	NE/SW	A1/F2	
GB3SXE	28.200	Crowborough	8	Dipole	230	01/180	F1A	H + 25 And 55
GB3UOS	3456.000	Sheffield	4	Slotted Waveguide	400	N/S	F2	Temp Non Op
GB3VHF	144.925	Wrotham, Kent	40	2 X 3 El Yagi	268	288/348 Max315	F1A/F1B	
GB3WHA	432.810						Not op	
GB3WWH	2320.910	Westbury, Wilts	20	3 X Yagi	230	Omni	A1A	Operational
GB3XGH	10400.000	Chester	1	Omni	100		F2	Temp Non Op

the last...

GETTING YOUTH INVOLVED

G6EER in the October 'Last Word' makes the very valid point about school being an excellent point of contact with potential young amateurs. The Institution of Electrical Engineers operates a Schools Liaison Service throughout the UK with the objective of attracting young people into the electrical engineering profession at all levels. This aim exactly parallels that of Project YEAR and in my opinion the two activities complement each other.

The task of the Schools Liaison Officer (SLO) (in the North East of Scotland anyway) is very demanding and any activity which enables the SLO to bring a new dimension to this liaison work is most welcome. In short, contact with the relevant teachers in many areas has already been made and can be built upon. Help from amateurs (or other enthusiasts) would always be welcome and I, for one, will use Project YEAR and the proposed novice licence as one more 'weapon in the armoury' to encourage pupils to take an interest in the electrical engineering profession.

Should any RSGB member be interested in helping to encourage an interest in electronics then they can contact their nearest SLO via the Schools Liaison Service at the IEE in Stevenage. Any member in Moray district who would be interested in helping can contact me OTHR.

Barry Horning, GM4TOE

BARTG'S ABSENCE

I'm writing to explain who some people may have thought that BARTG had failed to turn up at the Woburn Rally.

The advert on page 71 of the July issue of *RadCom* showed that BARTG would be attending this rally. We have attended this rally for several years. Unfortunately, this advert was made up before we had received the invitation to attend the rally. The organisers had clearly assumed that we would, once again, attend the event and so had kindly featured us in the advert.

BARTG, however, had decided to reduce rally attendance in 1989 and so had decided not to attend the Woburn Rally.

The advert thus billed BARTG as attending but we actually declined the offer of a stand.

Ian Brothwell, G4EAN (Sec & PubOfficer)

DX PILE-UPS

May I offer my support to the views expressed by G3SXZ and VS6WU

regarding the sometimes awful operation procedures used by many European stations in the big DX pile ups. I offer my comments as one who has held a number of DX calls and operated from others.

Many moons ago I was one of two operators of the first ever SSB station (FL8AC) from the, then, state of French Somalia. One of our outstanding pains was a well known G station who, having got his contact, then proceeded to call about every hour, presumably to show he could break the pile up any time he chose. I eventually had to threaten not to QSL this clown and to remove his QSO from the log before he would stop. I note with some dismay that this station is now in the top echelon of the DXCC listings so perhaps a big Tx and bad manners do pay off!

I have operated from VP8KE, VS9ABL, FL8AC, HZ1AB and G3TXH/W2, 3, 4. I have to agree, more or less with the bad guys as listed by G3SXZ. Believe you me, it sounds even worse at the sharp end than it does from here.

Brian Levett, G3TXH

CONTESTS

To prevent prodigious use of paper by those who will inevitably disagree, this letter describes itself as an ill-informed, ill-considered, inaccurate, irrelevant, rambling, complaining, whingeing tirade of abuse - to borrow merely from the latest set of epithets offered in furtherance of this discussion.

Are all amateurs not in the same broad church? Would it not be better for all to live and let live? It seems quite practicable that contest organisers should specify more restricted segments of bands within which contest OSOs will be valid (yes, but are contests supposed to be easy?). Let such a practice become generally established as common-sense, even following common courtesy, will lead the rest to plan their 'sked' and rag-chews elsewhere, safely away from the linear plus six-over-six 'big guns' who arouse such disapproval - or is it really envy?

And would it not be better to try to interest non-participants in contests, rather than put their backs up further? it is a regrettable fact that on attempting to venture a toe in the water one has been abused over the air, apparently having been considered to have committed some solecism, the nature of which was not made clear. Contests seem to the uninitiated to be unnecessarily complicated

and impossibly dominated by the aforesaid 'big guns'. It is proposed that occasional contests be instituted, with understandable rules and a handicap system based on power, antenna system etc (weightings would have to be developed from the results of the first essays), into which beginners may more comfortably venture. Specific details, which might only result in the fundamental idea being submerged in a wrangle about trivialities and a welter of statements about lack of comprehension of assorted subtleties, are not offered now; constructive suggestions from the enlightened will be welcomed.

Alex Dick, GM0IRZ

SILLY AWARDS?

I see that among the 'awards' now being offered is one relating to the collection of STD codes.

What on earth has happened to amateur radio? I can see the point in collecting countries, continents, special event stations - and even, albeit with some difficulty - partaking in contests. But collecting STD codes?

What club, I wonder, will offer an 'award' for working 25 licensed traffic wardens between 0900hrs and 1700hrs on alternate Tuesdays when there's an 'r' in the month?

Surely it can't be long.

Stewart Mackay, G14OCK

QSL BUREAU G3EAA-HZZ SERIES

Following my giving up the Sub-Managership for the above section I would like to thank all the stations who have collected their QSL cards from me over the past 15 years. Also my thanks to the many people who have written letters of appreciation both recently and in the past. I regret I am unable to reply to every one personally.

Please keep your new QSL Sub-manager well supplied with SAEs at current postage rates. Thanks again.

Stan Newport, G4DEV

LINGUISTIC LETHARGY?

I would like to refer to two letters in the current issue. First, to agree wholeheartedly with Mr Lee, G3UJX, regarding the pronunciation of 'kilometre'. Unfortunately many of the professional broadcasters are chosen because they are what is euphemistically called 'outgoing', ie brash. It is a corollary of such people that they are often both ignorant and insensitive. Consequently English is daily murdered by someone on radio or TV. Bureaucrats are much the same. Hence the meaningless Hertz, kiloHertz, etc. But I notice that radio amateurs still cling to the term 'Kcs'. I suggest we QSY ten Kcs down, old man! I have yet to hear

anyone refer to 'Kay Aitches'!

As for 'black boxes' (Mr Humphreys, G13EVU) again I agree. Anyone with a mechanical bent must agree that there is an undoubted pleasure in handling quality equipment. After struggling with clumsy spark transmitters in the pre-war OTC, even the old 10832/83 was a delight to use, and even more so the 1154/55 and the superb American equipment, BC348 etc. But home brewing is fun too!

John Allison, G0LYY

'SEXIST CALLBOOK' CONTINUED...

My feelings were of surprise when I read the letter, from G3HBZ, headed 'Sexist Call Book', suggesting that if all the entries of women radio amateurs were entered WITHOUT stating whether they are Mrs, Miss, or Ms; much space would be saved in the *RSGB Call Book*.

I suspect that he wrote 'with his tongue in his cheek'. He does not mention that there are OMs who include their various titles, such as for instance Captain, Doctor, Reverend, but in shortened form of course.

Surely the easiest way to make more space available in our *Call Book* should the need arise, would be to enter all the call signs of the 'particulars withheld' stations towards the back of the book, in say ten or twelve columns per page, with one heading PER PAGE!

Happy Christmas to all readers, or maybe I should take up less space and say Happy Noel?!

Miss C Hall, G8LY

I am writing in reply to the letter from Mr NEA Rush in the November issue of *RadCom*. I would guess that being a G3, Mr Rush comes from an era when it was automatic to open doors or give up your seat for a female, so I am most surprised to learn that he doesn't agree with the RSGB giving us ladies our correct title, be it Mrs, Miss or Ms. I am sure if Mr Rush was a distinguished gentleman with a title, he would be most upset if the title was omitted from the callbook! So come on Mr Rush, I know we live in a world of equality, but there are still a few of us ladies who would like to keep our identity and we thank the RSGB for their good old fashioned courtesy.

Mrs Lindy Jasper, G0GZN

HELPFUL HELPLINES

In October *RadCom* you published on my behalf in 'Helplines' my request for information on the TR-1986 tcvr. To date, I have received four letters and two phone calls with offers of help and information. Block diagrams have been sent and one splendid individual has even provided me with a manual complete with circuit diagram.

I have thanked all correspondents personally by letter, but I feel that such a generous response should be acknowledged publicly as it demonstrates the true spirit of amateur radio and I am most grateful to all concerned.

WAW Lankshear, G0HFB

Please note that the views expressed in 'Last Word' are not necessarily those of the RSGB. We reserve the right to edit letters and regret that we can no longer acknowledge them individually but will pass them on to the relevant department.

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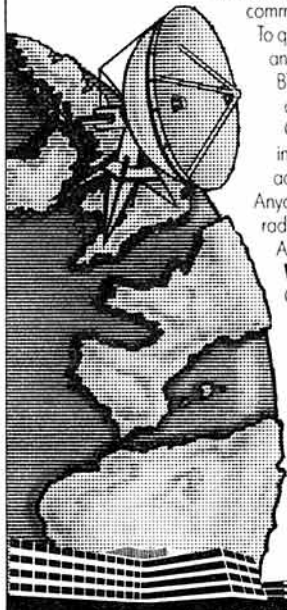
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INDEX TO ADVERTISERS — DECEMBER

Allweld Engineering	79	R.A. Kent (Engineers)	80
Amcomm of London	59	Klingenfuss Publications	66
AMDAT	66	KW Communications Ltd 34, 62 & 90	
ARE Communications Ltd	77	Lake Electronics	81
Arrow Electronics Ltd	31	London Amateur Radio Show	62
J. Birkett	79	Loudenboomer	76
Blue Rose Electronics Ltd	76	Lowe Electronics Ltd 32, 33 & IFC	
Border Communications Ltd	78	Mauritron Electronics Ltd	90
Bredhurst Electronics Ltd	67	Nevada Communications	75
C-Fone	90	PW Publications	80
Cambridge Kits	67	Qualitas Radio	79
The 'Chip' Shop (Semicons) Ltd 81		Quartslab Marketing Ltd	62
C.R. Supply Co	67	Radio Shack Ltd	64
Datong Electronics Ltd	63	Random Electronics	77
Dee Comm Amateur Radio Products		Raycom Comms Systems Ltd	65
.....	64	R&D Electronics	78
Dewsbury Electronics	68	Revco Electronics Ltd	66
Dressler Communications Ltd	81	S.E.M.	78
Edenfield Communications	79	Siskin Electronics Ltd	77
G4TJB QSL Cards	62	South Midlands Comms Ltd	
G4TNY Amateur Radio	68	 28, 29, 30 & OBC	
G4ZPY Paddle Keys	79	Stephens-James Ltd	76
Garex Electronics Ltd	63	Technical Software	64
GCHQ	90	Tennamast Scotland	68
Hately Antenna Technology	76	Total Communications	81
HRS Electronics plc	60,61	T.V. Masters	80
ICOM (UK) Ltd	48, 49 & IBC	Uppington Tele-Radio	67
ICS Electronics Ltd	45	Ward Electronics	76
J & P Electronics Ltd	62	Waters & Stanton	27
Kanga Products	77	Colin Wilson	77



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